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# STRAITS BRANCH
# ROYAL ASIATIC SOCIETY

[No. 53]

# JOURNAL

September, 1909.

Smithsonian Institution
JAN 18
230986

Agents of the Society

London: Kegan Paul, Trench, Trübner & Co.

PRINTED AT THE METHODIST PUBLISHING HOUSE SINGAPORE

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of the

# Straits Branch

of the

# Royal Asiatic Society

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# The Primates, Carnivores and Ungulates of the Peninsular Region.

By C. Boden Kloss, F.Z.S.

This account of some of the animals of the Peninsular Region* will probably be of little service to the Zoologist and is not intended for him. But the Straits Asiatic Society has recently agreed to aid a survey of the mammalian fauna of the Malay Peninsula and its lay-members and other local residents who take an interest in such matters should be able with the aid of the keys—which apply only to Peninsular species *inter se*—together with the descriptions—which I have endeavoured to keep free from technicalities—to identify such animals of the three orders now dealt with as may come within the range of their experiences.

The first order contains the monkeys, which, owing to their similarity and near relationship to ourselves, are interesting to all; the other two include those more important and conspicuous mammals that, as big and small game, claim the attention of the shikari.

Of species marked with an asterisk our knowledge is still incomplete, and further information, particularly of their exact distribution beyond that given, is required; to ask for more assistance would probably be useless; nevertheless skins, however roughly made, if accompanied by skulls would be greatly valued.

The reference given as "Blanford" is to the volume entitled "Mammalia" by W. T. Blanford in the "Fauna of British India" Series; which for the time being presents the most complete account of the Malayan Mammals. The other references explain themselves and are to various journals or proceedings not so comprehensive or accessible.

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*For a definition of the Peninsular Region and a complete enumeration of all the Mammals inhabiting it see Kloss, Journal F. M. S. Museums, Vol. II, No. 3.

## Order PRIMATES.

**(Man, Apes, Monkeys and Lemurs).**

*Key to the Suborders.*

A. Second digit of foot with a flat nail like those of the other toes: no interval between central upper incisors: bony orbit of skull completely enclosed behind ... ... ... ANTHROPOIDEA.

B. Second digit of foot with a long claw differing from the nails of the other toes: an interval between the central upper incisors: bony orbit of skull not enclosed behind ... ... LEMUROIDEA.

### Suborder ANTHROPOIDEA.

**(Mankind and Monkeys).**

*Key to the Families.*

A. No tail: stature erect: great toe not opposable: arm shorter than leg: no interval between upper canines and incisors ... ... HOMINIDÆ.

B. No tail: stature semi-erect: great toe opposable: arm longer than leg: an interval between upper canines and incisors ... ... SIMIIDÆ.

C. Tail present: stature not erect: great toe opposable: arm not longer than leg: an interval between upper canines and incisors ... CERCOPITHECIDÆ.

## Family HOMINIDAE.

(Man).

Contains one species, Man, which differs so greatly from all other mammals on account of its highly developed opposable thumb and powers of speech that it is always given separate treatment.

## Family SIMIIDAE.

(Man-like Apes).

*Key to the Genera.*

| | |
|---|---|
| A. A naked gular pouch beneath the chin | SYMPHALANGUS. |
| B. No naked gular pouch beneath the chin | HYLOBATES. |

### Genus SYMPHALANGUS.

This genus contains the "Siamang," the largest ape inhabiting the Malay Peninsula. The arms are so long that the knuckles of the hand touch the ground when the animal is standing erect. Small naked callosities are present on the buttocks and a pronounced web connects the toes of the feet. The hair of the forearm is directed upwards towards the elbow and the species has a more developed chin than any other ape. The voice is very powerful.

1.* SYMPHALANGUS CONTINENTIS, Thomas. The Siamang. Ann. & Mag. Nat. Hist., Ser. 8, Vol. 1, p. 1908. *Hylobates syndactylus*, Flower, P. Z. S. 1898, p. 924; Robinson, Jour. F. M. S. Mus. 1905, p. 26. *Symphalangus syndactylus*, Bonhote, Jour. F. M. S. Mus. 1908, p. 2.

Malay name "Siamang."

Colour of fur black throughout with the exception of a scanty whitish patch on the chin. Naked skin of face, gular pouch, hands and feet black. Head and body about 20 inches.

Limits of range in the Peninsula unknown, but the species is found throughout the F. M. S., especially in hilly country, from Upper Perak to Negri Sembilan and eastward to Gunong Tahan: not known in Johore.

### Genus HYLOBATES.

The Gibbons are, with the exception of one species of *Symphalangus*, the smallest of the anthropoids. They have no naked gular sac, the membrane between the toes, though occasionally present, occurs only in a very modified form, the hair of the forearm grows towards the wrist and the mandible is relatively the lightest and most fragile of all the Simiidæ; otherwise their general resemblance to the Siamang is very close. Their cry is a series of loud ringing calls uttered most frequently in the early morning.

*Key to the Species.*

| | |
|---|---|
| A. Hands and feet distinctly whitish ... | H. LAR. |
| B. Hands and feet of the same colour as body ... | H. AGILIS. |

2. HYLOBATES LAR, (Linn.) The White-handed Gibbon. Blanford, p. 7.

Colour of fur varies from pale brownish buff (biscuit-colour) to sooty brown, and is sometimes piebald. The dark form is most numerous but individuals of every tint mate together and parents of one colour often have infants of the other. Hands feet and a ring of hair round the face whitish, always to be distinguished even in the palest individuals. Length of head and body about 18 inches.

Throughout the Peninsula but not in the adjacent islands.

3.* HYLOBATES AGILIS, F. Cuvier. The Agile Gibbon. Cantor Jour. As. Soc. Bengal, 1846.

Resembles *Hylobates lar* in colour and in variability but hands and feet are always concolorous with the limbs and body.

In examples from the Larut Hills, Perak, some individuals show a narrow whitish brow-band broadening on the cheeks into bush-like whiskers (which sometimes include the ears and extend beyond them below) and then narrowing again on the throat leaving, in dark specimens, the chin and sides of throat dark. Others have only a brow-band white. Length of head and body about 18 inches.

One young specimen is brownish to ochraceous-buff with the entire head pale buff in strong contrast with the body.

A very large female from the same locality with a narrow brow-band has the same pale extent only indicated in her infant.

Limits of range in the Peninsula unknown but recorded from the Larut Hills, Perak, and from Temerloh, Pahang.

## Family CERCOPITHECIDAE.

### (Monkeys).

*Key to the Subfamilies.*

A. Cheek pouches absent; muzzle not pronounced; tail always much longer than head and body SEMNOPITHECINÆ.

B. Cheek pouches present; muzzle elongated; tail variable, often shorter than head and body CERCOPITHECINÆ.

## Subfamily SEMNOPITHECINÆ.

### Genus PRESBYTES.

This genus contains a number of slender-limbed, crested monkeys of active habits and purely herbivorous diet. The stomach is divided into a number of pouches and from their habit of feeding mainly on leaves and young shorts the animals have been given the name of "leaf-monkeys:" they rarely support confinement for any length of time. In the skull the nasal aperture extends considerably above the lower level of the orbits. The thumb is well developed and a row of stiff black hairs projects above the eyes. The young differ in colour from the adults. Malay name "Lotong."

### *Key to the Species.*

A. Last lower molar with five well-developed cusps; inner side of thigh not lighter than outer side.

*a.* Colour blackish, hair of head growing forward on crown and temples in three distinct peaks ... ... P. CRISTATA.

*b.* Colour ashy, hair of head falling backwards from crown and nape and forming a distinct flat nuchal cap ... P. OBSCURUS.

B. Last lower molar with only four cusps or with a very rudimentary posterior fifth cusp; inner side of thigh lighter than, and sharply margined from, outer side; hair of head radiating from two points on forehead and growing backwards on temples, upwards on crown and nape in a median ridge.

*a.* Colour blackish, sides of neck and rump dark ... ... P. FEMORALIS.

*b.* Colour ashy, sides of neck and rump pale P. ALBOCINEREUS.

4.* PRESBYTES CRISTATA (Raffles). The Silvered Leaf-Monkey. *Semnopithecus cristatus*, Cantor, Jour. As. Soc. Bengal, 1846.

Malay name "Klabu."

Pelage black or sooty, strongly washed throughout with silvery or yellowish white. Hands and feet and skin of face black. Head and body about 21 inches, tail 30 inches.

Young, orange-yellow but rapidly assuming adult colouration which commences on crown and extremities.

The Peninsular representative of this lotong is known to me from the coasts of Perak and Selangor only ; Cantor records it from Penang but his specimens probably came from Province Wellesley.

5. PRESBYTES OBSCURUS (Reid.) The Dusky Leaf-Monkey.
*Semnopithecus obscurus*, Blanford, p. 41.

Malay name "Chengkau."

Pelage ashy-grey to blackish-brown, slightly paler below ; crest, tail and outer side of thighs silvery ; hands and feet blackish ; lips and chin clothed with white hairs. Skin of eyelids, lips and chin whitish to bluish pink. Head and body about 20 inches, tail 30.

Young, orange-yellow with darker crown and extremities.

Throughout the Peninsula. Penang and Langkawi Islands.

6. PRESBYTES FEMORALIS (Horsf). The Banded Leaf-Monkey. *Semnopithecus femoralis*, Blanford, p. 42.

Malay name "Kaka."

General colour sooty or brownish black; crest, nape and back paler: hands and feet, terminal half of tail, forehead and cheeks black. Inner sides of arms, lower abdomen, and entire inner side of thigh, extending thence narrowly to heels whitish: the latter areas sharply margined. Sometimes a whitish stripe down the centre of chest and on the under side of base of tail. Skin of eyelids and lips pale. Head and body about 21 inches tail 30 inches.

Young, white with crown and end of tail black.

Throughout the Peninsula and Singapore Island.

Schlegel (Mus. Pays-Bas, VII, p. 47) has separated the Singapore animal under the name of *Semnopithecus neglectus*. The characters of this are:—black, slightly guzzled with whitish:

with hands, feet and temples clear black and nuchal crest and back sooty: middle line of chest, abdomen and inner side of limbs white: tail uniformly black. Animals of this form however also occur in Johore where they completely intergrade with those having the appearance described above.

7.* PRESBYTES ALBOCINEREUS (Cantor). The Pale Leaf-Monkey. *Semnopithecus albocinereus*, Cantor, Jour. As. Soc. Bengal, 1846. Bonhote, P.Z.S., 1900, p. 872. *Semnopithecus mitratus*, Flower, P.Z.S., 1900, p. 319. *Semnopithecus siamensis*, Thomas, P.Z.S., 1886, p. 72.

Typical pelage, ashy-brown above, forehead and temples darker; throat and sides of neck, inner sides of arms and legs, buttocks and outer sides of thighs much paler or white; hands, feet and tail blackish. Skin of eyelids and lips pale. Head and body about 21 inches, tail 30 inches.

Many individuals have their colouration less clearly defined than as described above and very nearly approach in appearance the browner phases of *P. femoralis*. From the latter however they can always be distinguished by their paler under surface and by the white areas which are always present to some degree on the sides of neck and buttocks. The two species are very closely related.

Young, darker than adult above and white below, colours distinctly margined.

Range not defined but recorded from Kelantan to Selangor in which latter locality it is very common.

## Subfamily CERCOPITHECINÆ.

### Genus MACACA.

The Macaques are stout-limbed, crestless monkeys with pronounced muzzles and a less striking colouration than the lotongs. The species vary greatly in length of tail. In the skull the nasal aperture is placed between the lower edge of the orbits and the extremity of the muzzle. In habit they are semi-arboreal and their diet is both animal and vegetable : they thrive well in confinement.

*Key to the Species.*

A. Tail more than three-fourths the length of head and body ... ... ... M. FASCICULARIS.

B. Tail about one-third the length of head and body M. NEMESTRINA.

C. Tail about two inches long only ... M. RUFESCENS.

8. MACACA FASCICULARIS (Raffles). The Crab-eating Macaque. *Macacus cynomolgus*, (Linn); Blanford p. 21.

Malay name "Krah."

Crown of head, neck and back a speckle of black and ochraceous giving a general golden-brown or rufous effect but becoming gradually greyish on the limbs, sides of neck, tail and under parts. Eyebrows black. Head and body about 20 inches; females smaller. In immature animals the tail is longer than the head and body, in adults it is often a little shorter.

Throughout the Peninsula and adjacent Islands.

9.* MACACA NEMESTRINA (Linn). The Pig-tailed Macaque. Blanford, p. 20.

Malay name "B'roh."

Males :—Eyebrows, centre of forehead, crown, upper nape, lumbar region, rump and upper side of tail sooty black, everywhere distinctly margined except on neck and back. Behind and above ears, the eyes, sides of forehead, cheeks, throat and chest and a small area surrounding the callosities greyish white ; muzzle and abdomen yellower. A line from crown running round the front of ears mingled ochraceous and sooty. Under side of tail greyish-buff, tipped ochraceous. Remainder of pelage, including the back across shoulders, strongly annulated ochraceous-buff and sooty, producing a speckled russet effect darkest on sides and hind limbs which are concolorous, the fore limbs being paler on the inner sides. Base of fur greyish white throughout except on crown and back. Only the pale grey and sooty areas are unspeckled, the grizzling being very marked across the shoulders. Head and body about 21 inches, tail 8 inches.

Females generally resemble the males but are much smaller, the dark areas are less intense and sharply margined, the annulations, except across the shoulders and on the sides, are very indistinct and there is no pale border to the callosities.

Mr. G. S. Miller in his paper on "The Monkeys of the *Macaca nemestrina* group," (Proc. U.S. Nat. Mus., Vol. XXIX, p. 555-563) has separated Tenasserim animals from the typical Sumatran form under the name of *Macaca adusta.*

His characters for the latter are :—fur distinctly annulated back so little darkened that the blackish tail forms a conspicuous contrast, noticeably paler than sides and thighs, canines not excessively heavy, skull broad.

In *Macaca nemestrina typica* the fur is either not annulated or indistinctly so, the back so dark that the blackish tail forms no noticable contrast with it, buttocks not noticeably paler than sides of thigh, canines excessively heavy and skull elongate.

The Peninsular animal as represented in specimens from the F.M.S. agrees with neither of these. In the concolorous back and tail it approaches *M. nemestrina* while in the strongly annulated fur and pale buttocks it agrees with *M. adusta.*

Skull and teeth however exactly resemble those of *M. nemestrina* from Sumatra as figured and cited by M. Miller except that the condylo-basilar, basilar and palatilar lengths are a little greater. Because of this and because I don't wish to make another geographical race out of the local representative of a group in which I think there is much individual variation, I have kept the older name for the Peninsular animal. It is possible however that the other form will also be found to occur in the northern districts of our area.

10.* MACACAS RUFESCENS, Anderson. The Ruddy Macaque. Anderson, Zoological Researches, 1879, p. 79. Bonhote, P.Z.S. 1900, p. 871.

Face red, most brilliant round the eyes. General colour of pelage a warm reddish brown, darker on the back. Crown light in colour, hair short and radiating from a central point. Tail about an inch long and covered with hair.

Only one authentic specimen is known from the Peninsula; a female collected at Patalung, 7th April, 1899, by Messrs. Evans and Laidlaw. The two previously collected examples in existence were purchased at Singapore and Calcutta. None of them are fully adult and further material is required before the standing of the species can be properly determined. (An adult female was obtained a few years ago by Dr. W. L. Abbott at Victoria Point, the southern extremity of Tenasserim, but it has not yet been reported upon).

## Suborder LEMUROIDEA.

### (Lemurs).

Only one genus, *Nycticebus*, of this suborder occurs in the Peninsular area. Young Malayan animals always have four upper incisors, though sometimes one or two are missing in adult individuals; the lower canines only differ from the incisors in their greater depth and the first premolar is so large as to be mistaken for a canine. The tail is very short as is the second digit of both hand and foot while the first of each is long, opposable and widely divergent. The fur is exceedingly dense and woolly and covers the face with the exception of the muzzle.

### Genus NYCTICEBUS.

11. NYCTICEBUS MALAYANUS (Anderson). The Peninsular Slow Lemur. Anderson, Cat. Mamm., vol. I, p. 95. Stone and Rehn, Proc. Acad. Nat. Sci. Philadelphia, 1902, p. 138. Lydekker, P.Z.S., 1904, vol. II, p. 345, plate XXIII. Lyon, Proc. U.S. Nat. Mus., 1906,

p. 533. *Nycticebus tardigradus*, Blanford, p. 44.

Malay name "Kongkang."

Ochraceous, brown above, darkest on neck and shoulders where the white tips of the hairs cause a frosted appearance. Chest and temples greyish white. Limbs and underside much paler and greyer, owing to the bases of the hairs, which are dusky throughout, appearing through the shorter and scantier fur. A broad brown stripe down the centre of the back, not reaching the tail, branches on the crown into four and extends to the ears and eyes. There is a more or less distinct white stripe down the centre of the face. Length of head and body about 12 inches.

Throughout the Peninsula, Singapore, Penang and Junk Ceylon.

Other forms *Nycticebus coucang* and *N. cinereus* in which the general colour is duller and greyer and the face markings indistinct or obsolete occur in Burmah and Siam and may possibly extend into the northern portions of the Peninsula.

## Order CARNIVORA.

### (Flesh-eating Animals).

*Key to the Families.*

A. Auditory bullæ much dilated, rounded and divided into two chambers by a septum. Paroccipital processes flattened against the bullæ and not projecting behind. Condyloid and glenoid foramina concealed or wanting.

  *a.* Head short; 3 or 4 upper cheek-teeth,* 3 lower; claws sharp, curved and completely retractile; toes 5–4 FELIDÆ.

  *b.* Head elongate; 5 or 6 cheek-teeth in each jaw; claws variable; toes 5–5 VIVERRIDÆ.

---

* All the teeth behind, but not including, the canine.

B. Auditory bullæ much dilated, rounded but not divided. Paroccipital processes flattened against bullæ but projecting behind. Condyloid and glenoid foramina distinct.

Head elongate; 6 upper cheek-teeth, 6 or 7 lower; claws blunt, not retractile; toes 5–4 ... ... CANIDÆ.

C. Auditory bullæ not rounded nor divided but flattened. Paroccipital processes prominent and quite free from bullæ. Condyloid and glenoid foramina distinct.

*a.* Size small; 4 or 5 upper-cheek teeth, 5 or 6 lower; toes 5–5 ... MUSTELIDÆ.

*b.* Size large; 6 upper cheek-teeth, 7 lower; toes 5–5 ... ... URSIDÆ.

## Family FELIDÆ.

(Cats).

### Genus FELIS.

This is the only genus of the family occurring in the Peninsular region: it contains the cats, the most typical and specialised of flesh-eating mammals.

The claws which are large, sharp and moveable are actuated by powerful muscles and like the sharp-edged pointed teeth are peculiarly adapted for cutting and tearing flesh. The tongue is furnished with papillæ which form a rasp-like surface on it and enable the animals to lick the flesh from the bones of their prey. Many of the smaller species are arboreal in habits.

*Key to the Species.*

A. Back and sides banded ... ... F. TIGRIS.

B. Back and sides rosetted ... ... F. PARDUS.

C. Back and sides blotched or marbled

*a.* length of head and body more than 3 ft. F. NEBULOSA.

*b.* length of head and body less than 2ft. F. MARMORATA.

D. Back and sides unevenly spotted F. BENGALENSIS.

E. Back and sides unmarked

*a.* head and body about 30 inches, tail 20 inches long ... ... ... F. TEMMINCKI.

*b.* head and body about 24 inches, tail 6 inches long ... ... ... F. PLANICEPS.

12. FELIS TIGRIS, Linn. The Tiger. Blanford, p. 58. Flower, P. Z. S. 1900, p. 322.

Malay name "Harimau."

Back and sides ochraceous to buff fading to white on the under surface; barred throughout with black except on the lower legs and feet. Head and body about 70 inches.

Throughout the Peninsula and Singapore. Flower states that tigers seem to be entirely absent from Penang but they have since been recorded.

13. FELIS PARDUS, Linn. The Leopard or Panther. Blanford, p. 67.

Two forms of the leopard occur locally, a pale and a black (*Felis melas* of some authors). The presence of the latter variety has been connected with dense forests and a moist atmosphere: south of Malacca it practically replaces the other entirely.

*Felis pardus typicus*:—Ground colour above a variable brownish yellow, below whitish; rosettes and spots blackish. Malay name "Rimau bintang."

*F. p. melas*:—Ground colour throughout chestnut black; rosettes darker, lustrous, distinctly visible. Malay name "Rimau kumbong." Head and body about 480 inches.

Throughout the Peninsula, Singapore and (?)Penang.

14.* FELIS NEBULOSA, Griffith. The Clouded Leopard.
Blanford, p. 72.

Malay name "Rimau akar."

Inferior in size to the tiger and leopard only. Ground colour greyish brown to buffy, paler or white below. Head spotted above, neck and back striped with broad black patches, sides blotched with large irregular dark patches with darker edge or else with uneven stripes. Lower parts and limbs spotted. Tail thickly furred. Head and body about 40 inches.

Throughout the Peninsula and (?) Singapore.

15. FELIS MARMORATA, Martin. The Marbled Cat.
Blanford, p. 74.

Malay name "Rimau dahan."

Head, throat, chest, front and inner sides of thighs bright buff; body pale grey washed with buff on centre of back, shoulders, limbs and tail; abdomen whitish. Head vermiculated with black; back and sides marbled with darker black-edged patches which become irregular black spots and blotches on the limbs and tail; two distinct black stripes down the top of head and neck and another down the rump. Back of ears with pale grey patches. Tail long and cylindrical, very densely furred. Head and body about 20 inches.

Throughout the Peninsula.

16. FELIS BENGALENSIS, Kerr. The Leopard Cat.
Blanford, p. 78.

Malay name "Kuching utan."

Above and outer sides of limbs pale brownish-buff, deepest along the back; below white. Head striped; body and limbs sprinkled with dark spots with are elongated along the back where they appear to form broken lines. Head and body about 24 inches.

Throughout the Peninsula and Singapore.

17. FELIS TEMMINCKI, Vig. and Horsf. The Golden Cat. Blanford, p. 75.

Malay name "Rimau anjing."

Uniformly coloured above chestnut to brown, darkest above, palest below; a few indistinct markings on the under side and the upper surface occasionally sprinkled with small obsolete spots. Head and body about 30 inches.

Throughout the Peninsula.

18. FELIS PLANICEPS, Vig. and Horsf. The Flat-headed Cat. Blanford, p. 83.

Malay name "Rimau burong" or "Kuching jalang."

Uniformly coloured above a rich brown; the tips of the hairs light, causing a frosted appearance. Under surface and legs with obsolete bars. Sometimes small obsoletes pots visible on sides of body and legs. Head and body about 24 inches. Tail short.*

The Peninsula south of Province Wellesley.

## Family VIVERRIDÆ.

(Civets and their allies, Mongooses).

*Key to the Subfamilies.*

A. Claws strongly curved and more or less retractile VIVERRINÆ.

B. Claws long, slightly curved, exserted, not retractile HERPESTINÆ.

---

*The domestic cat of the Malays is remarkable on account of its short and peculiarly twisted and knotted tail. *Felis planiceps* tends to resemble it in this particular and the name of "Kuching jalang" is applied by Malays to both it and to the domestic cat when run wild!

## Subfamily VIVERRINÆ.

*Key to the genera.*

- A. Tail more than one-third the length of head and body; facial bristles normal.
  - *a* Ears not tufted, tail not prehensile.
    - $a^1$ Tarsus and meta-tarsus hairy behind; tail with dark and light rings or semi-rings.
      - $a^2$ A black gorget.
        - $a^3$ An erectile black dorsal mane. ... VIVERRA.
        - $b^3$ No dorsal mane ... ... VIVERRICULA.
      - $b^2$ No black gorget
        - $a^3$ Tail semi-ringed on basal portion only HEMIGALE.
        - $b^3$ Tail completely ringed throughout PRIONODON.
    - $b^1$ Tarsus half naked behind; tail not ringed.
      - $a^2$ Teeth large; a bare patch on lower abdomen ... ... ... PARADOXURUS.
      - $b^2$ Teeth small; no naked patch on lower abdomen ... ... ARCTOGALIDIA.
  - *b* Ears tufted, tail prehensile ... ... ARCTICTIS.
- B. Tail less than one-third the length of head and body; facial bristles exceedingly stout and numerous CYNOGALE.

## Genus VIVERRA.

The members of this genus are the largest of the true civets. They are rather coarsely furred animals with erectile stiff black crests running down the median line of the back and with ringed tails: both sexes possess glands which secrete an odoriferous substance. In habit they appear to be purely terrestrial.

*Key to the Species.*

A. Dark and light rings on tail complete and separate; sides of body indistinctly marbled ... V. ZIBETHA.

B. Dark and light bars on tail incomplete and joined above; sides of body distinctly spotted.

*a.* Dark bars on tail less than ten; spots on sides large and not numerous ... V. MEGASPILA.

*b.* Dark bars on tail more than ten; spots on sides small and very numerous ... V. TANGALUNGA.

19. VIVERRA ZIBETHA, Linn. The Large Indian Civet. Blanford, p. 96.

Malay name "Musang jibet."

Ground colour grey or buffy grey, with indistinct dark marblings on the sides tending to form stripes on shoulders and thighs; feet dark. Head greyish, sides of muzzle white. Neck and chest boldly patterned with black and pale buff; black stripes down the centre of the back to the rump. Tail more than half the length of head and body, ringed blackish and pale, the dark rings, six or seven in number, broadest. Head and body about 32 inches, tail 16 inches.

Throughout the Peninsula, Singapore and Penang.

20.* VIVERRA MEGASPILA, Blyth. The Burmese Civet. Blanford, p. 99.

Malay name "Musang jibet."

General colour greyish or brownish buff; a black median line down the back and tail; sides with large blackish spots (about 20 mm. in diameter) except on shoulders which are brown and slightly striped. Head greyish, sides of muzzle white. Sides of chest and neck boldly marked blackish and pale buff. Lower legs and feet dark. Tail less than half the length of head and body, terminal portion entirely blackish, basal portion like body, with three or four dark semi-rings.

Blanford gives 37 inches for the length of head and body, but all Peninsular examples I have seen are considerably smaller than the last species.

The Peninsula.

21.* VIVERRA TANGALUNGA, Grey. The Malayan Civet.

Malay name "Tangelunga."

General ground colour pale buffy-grey: a black median line along the back and tail; sides covered with rows of small blackish spots which sometimes tend to form stripes; under surface much paler and scarcely spotted. Head buffy grey, sides of muzzle white, a whitish patch below the eyes; back of ears with black bases and whitish tips; chin dark ashy grey; feet and lower portion of limbs blackish ashy.

Tail ringed black and buffy, there being about fifteen broken or indistinct pale bars which almost disappear on the terminal portion. Upper side of tail almost unbroken black, lower buffy. Head and body about 25 inches, tail 15 inches.

The Peninsula. The above description is taken from Perak specimens but the range is unknown.

(Bornean animals, which I have compared with local individuals, appear to differ slightly in having the pale tail bars broader and more distinct but rather fewer).

### Genus VIVERRICULA.

Contains animals smaller than those of the preceding genus and more arboreal in habits. Nails more curved and the front toes smaller. Tail ringed but no stiff crest along the back. Only one species occurs here.

22.* VIVERRICULA MALACCENSIS, Gmel. The Smaller Civet.
Blanford, p. 100. Bonhote, A. M. N. H., 7, I, p. 119.

Malay name "Musang bulan."

General colour brownish grey to brownish yellow. Dark stripes on the back and rows of dark spots along the sides sometimes indistinct: the stripes occasionally entirely absent. Neck with dark stripes and bars. Feet dark. Tail, more than two-thirds the length of head and body, with a light tip and seven light bands. Head and body about 25 inches.

Specimens of this animal seem to have been frequently sent home from the Peninsula during the first half of the last century but it is now decidedly rare. The suggestion has been made to me that it never was native but only an introduced cage animal that has not succeeded in establishing itself: as it is now found in such remote and unusual spots as the Comoro Islands and Socotra, I think this theory very reasonable.

### Genus HEMIGALE.

The tree-civets of this genus are peculiar in being banded instead of striped and in having the hair on the back of the neck growing upwards. The soles of the feet are naked only to a small extent, the body and neck are elongated and slender and the muzzle is very pointed. One local species only.

23.* HEMIGALE HARDWICKEI (Gray). The Slender Banded Civet. Blanford, p. 117.

Malay name "Musang blang" or "Musang batu."

Ground colour pale brownish. Two dark brown stripes on the nape broadening on the shoulders, five or six broad bands across the back and others on the basal portion of the tail, the terminal half of which is dark brown. Face striped with dark brown. Head and body about 21 inches.

The Peninsula: recorded from Trang but not reaching Tenasserim.

### Genus PRIONODON.

The Weasel-civets are of an exceedingly slender form and are clad with velvet-like fur. The feet are covered with hair beneath and are armed with sharp retractile claws: the tail is very long and cylindrical. They are the smallest members of the family.

24.* PRIONODON MACULOSUS, Blanford. The Malayan Weasel-Civet. Blanford, p. 104.

Malay name "Anga prau" or "Musang buah."

Ground colour pale whitish brown. Across the back six irregular dark brown patches bordered laterally by a broken longitudinal stripe and by a row of spots of dark brown. Two broad dark brown stripes on the nape, and a row of dark irregular spots on the sides of the neck. Outer sides of limbs spotted, inner sides and lower surface of body unmarked. Tail with seven dark brown rings and a pale tip. Length of head and body about 18 inches.

The Peninsula, known southward to Malacca.

(*P. gracilis*, a smaller species of similar colouration, occurring in the Archipelago, has also been reported from the Peninsula by Cantor. Blanford thinks however, from the dimensions given, that his specimen was *P. maculosus*. Photographs taken by myself of Sumatran animals collected in Siak show a similar colour pattern to that of mounted specimens of *P. maculosus* in the Perak Museum).

### Genus PARADOXURUS.

The palm-civets are more numerous in the Peninsula than any other species of the related genera. They are of medium size and dull colouration; a large extent of the soles of the feet is naked and there is a naked patch on the lower abdomen: the claws are completely retractile. They are arboreal and noctural and subsist on a mixed diet. The Malay name for the genus is "Musang."

*Key to the Species.*

A. Body spotted or striped.

*a.* Forehead with a distinct white cross-band; fur greyish, smooth and equal, skull and teeth robust.

$a^1$ Head and body more than 20 inches; dorsal stripes blackish and well defined.
  $a^2$ Teeth normal, 4th upper cheek tooth not more than 9 mm. long P. HERMAPHRODITUS
  $a^2$ Teeth very large, 4th upper cheek tooth more than 10 mm. long P. (H.) MACRODUS.
$b^1$ Head and body not more than 20 inches, dorsal markings brown and obsolete P. (H.) MILLERI.
*b.* Forehead only slightly grizzled, fur yellowish, skull and teeth slight ... ... P. MINOR.
*c.* Forehead with no trace of a pale band; fur blackish, ragged and long ... ... P. NIGER.
B. Body not spotted nor striped.
*a.* Colour reddish brown ... P. LEUCOMYSTAX.
*b.* Colour dull buff ... ... P. (L.) ROBUSTUS.

25. PARADOXURUS HERMAPHRODITUS, Pallas. The Malayan Palm-Civet. Blanford, p. 108; P. Z. S., 1885, p. 794.

Malay name "Musang pandan" or "Musang ayam."

General colour brownish grey: back usually with three blackish stripes bordered laterally by indistinct rows of spots. Feet and tail blackish, tail sometimes tipped white. A broad pale band across the forehead running below the ears to sides of neck, sometimes a black stripe crossing this band above the nose. Top and sides of face blackish, muzzle pale, a white spot occasionally below the eyes. Under surface paler, unmarked, palest round the bare abdominal patch. Head and body about 22 inches.

Throughout the Peninsula and Islands (except Tioman) where it is the commonest musang.

25A.* PARADOXURUS HERMAPHRODITUS MACRODUS, Gray. The Large-toothed Palm-Civet. Gray, Cat. Mamm. Brit. Mus., 1869, p. 70. Blanford, P. Z. S., 1885, p. 801. Sclater, Cat. Mamm. Ind., Mus., Vol. II. p. 246.

Externally does not differ appreciably from *P. hermaphroditus typicus* but has much larger teeth: the upper sectorial or fourth molar being nearly one-third as large again (11 x 8 mm.)

The Peninsula but exact range unknown.

26. PARADOXURUS (HERMAPHRODITUS) MILLERI, Kloss. The Tioman Island Musang. Kloss, Jour. F. M. S. Museums, Vol. II, p. 143. *Paradoxurus hermaphroditus*, Miller, Proc. Washington Acad. Sci., 1900, p. 228.

Smaller than *P. hermaphroditus typicus*, paler throughout and with brown not black markings. General colour pale silvery drab-grey, dorsal stripes practically obsolete: basal half of tail above like back, distal portion blackish brown throughout. Limbs brown. Head and body 20 inches.

Tioman Island, Southern China Sea.

27.* PARADOXURUS NIGER, Desm. The Indian Palm-Civet. Blanford, p. 106; P.Z.S. 1885 p. 792. Flower, P. Z.S., 1900, p. 328.

The Indian form of *P. hermaphroditus*.

General colour blackish or brownish fulvous; the hairs having fulvous bases with black tips causing the whole pelage to appear suffused with black. Black dorsal stripes indistinct and often only visible in the form of spots. Feet, greater part of legs and tail blackish, the latter sometimes tipped white. Face generally black or blackish, a pale spot below eyes and often another above and at roots of vibrissæ. Head and body about 22 inches.

The Peninsula; Perak, Trang (Abbott) and possibly northward to Tenasserim. Penang Id. (Flower).

28.* PARADOXURUS MINOR, Bonhote. The Small Palm Civet. Bonhote, Fasciculi Malayenses, Zoology, p. 9.

Malay name "Musang pulut."

Above pale fulvous with five black stripes, the outer ones broken; flanks slightly spotted; below dull brownish grey.

Muzzle, limbs and lower part of throat very dark brown: hairs of forehead grizzled. A small white spot below eye. Tail black except the tip which is white.

In every way a far smaller animal than the other members of the genus, skull especially much less robust and teeth much smaller. Head and body about 19 inches.

Known at present from Jalor and Perak, Malay Peninsula.

29. PARADOXURUS LEUCOMYSTAX, (Gray). The White-whiskered Palm-Civet. Blanford, P.Z.S., 1885, p. 805. Gray, Cat. Mamm. Brit. Mus., 1869, p. 73.

Malay name "Musang bulan" or "Musang tenggalong."

No spots or stripes.

General colour reddish brown, paler and yellower below; the entire upper surface slightly grizzled. Sides of head from eye to ear and extending to sides of neck bright buffy: front of face and throat occasionally similar. Ears and sides of muzzle, nape, shoulders, fore limbs, hind feet and tail variably blackish-brown. The tip of tail sometimes buffy. Whiskers yellowish white. Head and body about 28 inches.

The Peninsula and Singapore Island.

30.* PARADOXURUS LEUCOMYSTAX ROBUSTUS, Miller. The Paler White-whiskered Palm-Civet. Miller, Proc. Biol. Soc. Washington, 1906, p. 26.

Like *Paradoxurus leucomystax typicus* but smaller and paler. General colour dull buff, the back darker, being tinged with russet-brown and having the hairs everywhere black-tipped; but the darkening inconspicuous except on crown, neck and shoulders. Upper half of cheeks light buff, clearer than that of body; chin and throat darker. Feet, ears and tip of tail blackish. Whiskers pale buff. Head and body about 25 inches.

The Peninsula, where it is a possibly the northern form of the last species: type from Trang. Two old mounted specimens in the Perak Museum from Larut and Kuala Kangsar appear referable to this species but the feet, ears and tail tip are russet rather than blackish : this difference is probably due to fading.

### Genus ARCTOGALIDIA.

The Arctogales or Small-toothed Palm-Civets are in every way less robustly formed than the animals of the preceding genus: the teeth being notably smaller. There is no bald tract on the abdomen but the soles are naked to a greater extent and the first toe of both fore and hind feet is more divergent. The tail is semi-prehensile and in habit the animals are purely arboreal.

*Key to the Species.*

A. Back indistinctly striped, ears tipped whitish. A. LEUCOTIS.
B. Back clearly striped, ears black. ... A. MAJOR.

31.* ARCTOGALIDIA LEUCOTIS (Blyth). The White-eared Small-toothed Palm-Civet. Blanford, p. 115.

Malay name "Musang akar."

General colour above fulvous to dusky grey, sometimes brown; dull buffy below, always much paler. Three black stripes along the back, often broken or very indistinct. Sides of neck pale like lower parts: face, feet and end of tail dark brown or black. A narrow white line down the front of face to nose. Tips of ears whitish. Fur very soft. Head and body about 21 inches.

The Peninsula but range uncertain. Langkawi Id.

32.* ARCTOGALIDIA MAJOR, Miller. The Black-eared Small-toothed Palm-Civet. Miller, Proc. Biol. Soc. Washington, 1906, p. 25.

General colour above light brown, the back silvery; sides of body, neck and legs washed with ochraceous-buff: below dull greyish ochraceous-buff. Back heavily striped with three clear black lines. Face, feet and end of tail black, basal half of tail faintly banded. Ears black. Head and body about 22 inches.

The Peninsula but only known from Trang.

### Genus ARCTICTIS.

Contains one species only. Tail truly prehensile; ears tufted; soles naked; claws short, semi-retractile: fur coarse and long. In habits nocturnal, arboreal, omnivorous.

33. ARCTICTIS BINTURONG, (Raffles). The Binturong or Bear-Civet. Blanford, p. 118.

Malay name "Binturong" or "Menurong."

Black, grizzled with white or yellowish but mostly so on limbs and face. Ears bordered with white, ear-tufts black. Tail bushy and tapering. Head and body about 30 inches.

Throughout the Peninsula.

### Genus CYNOGALE.

One species only, an aquatic member of the Viverridæ. Feet webbed; muzzle broad; body stout; under-fur very dense and soft; numerous long and stiff white bristles growing from muzzle, cheeks and from above eyes. Tail about one-fourth the length of head and body. Teeth with long cusps.

34.* CYNOGALE BENNETTII, Gray. The Cynogale or Otter-Civet. Blanford, p. 119.

Malay name "Musang babi."

General colour dark reddish brown, the longer hairs with whitish tips giving a speckled appearance to the body: head and throat paler. Head and body about 26 inches, tail 8 inches.

The Peninsula, south of Province Wellesley.

## Subfamily HERPESTINÆ.

### Genus HERPESTES.

The Mongooses have the body slender, muzzle pointed and naked, ears short and rounded, tail tapering and covered with long coarse hair. The claws are long, straight, non-retractile, and the eye is, as a rule, completely ringed with bone. The species are carnivorous and terrestrial, living in holes.

Malay name "Bambun."

*Key to the Species.*

A. Pelage speckled throughout.
  - *a.* Size larger, head and body more than 15 inches: naked sole extending to heel: fur long and rather ragged ... ... H. MUNGO.
  - *b.* Size smaller, head and body not more than 15 inches: naked sole not extending to heel: fur short and fairly even ... H. A. BIRMANICUS.

B. Pelage not entirely speckled.
  - *a.* Colour blackish brown, tail considerably less than half the length of head and body H. BRACHYURUS.
  - *b.* Colour reddish-brown, tail rather more than half the length of head and body H. JAVANICUS.

5.* HERPESTES MUNGO (Gmel). The Common Indian Mongoose. Blanford, p. 123.

Greyish-brown speckled whitish throughout, paler below; sometimes a ferruginous tint on head and feet or ferruginous throughout. Long hairs of back annulated dark and light, four or five rings of each. Naked portion of soles narrow at heel. Head and body about 16 inches, tail about 14 inches.

The Peninsula, but range unknown.

35A.* HERPESTES AUROPUNCTATUS BIRMANICUS, Thomas. The Little Burmese Mongoose. Thomas, A. M. N. H. Ser. 5, XVII, p. 84, (1886). Blanford, p. 122.

Dark brown, finely speckled throughout with buffy or whitish grey, very little paler below: feet darker; head and cheeks tinged ferruginous. Base of fur dark brown: the long hairs of back annulated dark and light, two or three rings of each. Naked portion of soles not extending to heel. Head and body about 14 inches long, tail without hairs 10 inches. Hind-foot without claws 2.25 inches.

Two small mounted specimens of Mongooses in the Perak Museum, recorded as coming from the vicinity of Taiping, appear referable to this species and I have therefore included it locally though I have not been able to examine skulls. It also occurs in Burmah, and probably replaces *H. auropunctatus*, Hodgson, to the eastward of the Bay of Bengal for though a single example of the latter was obtained by Cantor in the Malay Peninsula it was almost certainly introduced.

36. HERPESTES BRACHYURUS, Gray. The Short-tailed Mongoose. Anderson, Zool. Researches, p. 187.

General colour blackish-brown speckled with yellow especially on the fore body and shoulders. Head paler; face, sides and top of muzzle pale yellowish brown, cheeks similar but grizzled. Chin and throat rusty yellowish brown. Fore limbs and lower half of hind limbs dark brown, unspeckled. Hairs of tail broadly tipped with black which almost obscure the pale speckle. Only half of the soles naked. Head and body about 18 inches, tail without hairs about 8 inches.

Southern half of the Peninsula where it is the commonest mongoose.

37.* HERPESTES JAVANICUS (Geoffr.) The Javan Mongoose. Bonhote P. Z. S. 1900, p. 873. Anderson, Zool. Researches, p. 186.

General colour speckled rufous olive-brown, dark on back, darker still and more rufous on the upper head and cheeks which are very finely speckled. Under side of neck, chin and chest rufous-yellow without speckling. Lower half of limbs altogether dark brown. Soles naked along the central line nearly to heel. Head and body about 17 inches, tail without hairs 11 inches.

The Peninsula but not known in the North.

## Family CANIDÆ.

### (Dogs)

*Key to the Genera.*

A. Six lower cheek teeth aside including two true molars ... ... ... CYON.

B. Seven lower cheek teeth aside including three true molars ... ... ... CANIS.

### Genus CYON.

Fur harsh; a moderate brush; long hairs between the pads of the feet; inner surfaces of ears densely furred; claws strong and blunt. Muzzle moderately long and slightly convex above. Inhabitants of forest where they hunt in packs.

38. CYON RUTILANS (S. Müll). The Malay Wild Dog. Blanford, p. 847.

Malay name "Srigala" or "Anjing utan."

Above tawny brown; throat, fore neck, under parts and inner sides of legs paler, often dull whitish. Tail bushy and blackish with the basal portion tawny. Head and body about 33 inches.

Throughout the Peninsula.

(There is in the Perak Museum a reputed hybrid between this species and the Sakai dog. While in colour it nearly approaches the latter, being dull buffy throughout, in size and form it resembles *Cyon rutilans*. It possesses however the seven lower cheek-teeth of the true dog.)

### Genus CANIS.

This genus, which includes the wolves, jackals and domestic dogs, is represented here by the latter animal only. Some of the forms bear a superficial resemblance to the local member of the last genus, but the elongate muzzle is straight or concave and the tail generally not bushy. Senses of smell and hearing acute: omnivorous.

38A. CANIS FAMILIARIS, Linn. The Pariah Dog.

Malay name "Anjing."

Colour very variable, though generally buff to tawny. Easily recognised on account of its vociferous animosity to Europeans.

Every Kampong in the Peninsular region.

## Family MUSTELIDÆ.

(Martens, Weasels, Hog-badgers and Otters).

*Key to the Subfamilies.*

A. Claws narrow, much curved, sharp and often semi-retractile; toes partially webbed; upper and lower cheek teeth unequal in number. Terrestial and arboreal ... ... MUSTELINÆ.

B. Claws much lengthened, slightly curved, blunt and non-retractile: upper and lower cheek teeth unequal in number. Terrestial, living in holes and fissures ... ... ... MELINÆ.

C. Claws broad, slightly curved, blunt and non-retractile; toes webbed; upper and lower cheek teeth equal in number. Aquatic. ... ... LUTRINÆ.

### Subfamily MUSTELINÆ.

*Key to the Genera.*

A. Five upper cheek-teeth, six lower ... MUSTELA.

B. Four upper cheek-teeth, five lower ... PUTORIUS.

### Genus MUSTELA.

Body long and slender, limbs rather short, claws cat-like, tail cylindrical. Habits principally arboreal. One local species in which the soles are naked.

39. MUSTELA FLAVIGULA PENINSULARIS, Bonhote. The Malayan Marten. Bonhote Ann. Mag. Nat. Hist. (7) p. 346. *Mustela flavigula*, Blanford, p. 158.

Malay name "Anga prau" or "Musang pisang."

Face, crown, limbs, posterior half of back and tail vandyke-brown becoming light raw umber on back of neck, shoulders and fore half of back, and blackish on tail and hind limbs. Chin dull white. Throat, sides of neck and chest bright buff, bordered on each side by a dark brown stripe from the ear. Under surface duller than the back with occasionally a buff patch on the abdomen. Head and body about 20 inches.

Throughout the Peninsula.

### Genus PUTORIUS.

Body very slender and elongate, limbs short, tail cylindrical and bushy, fur coarse. Claws curved and exceedingly sharp. Arboreal and predatory.

40. PUTORIUS NUDIPES (F. Cuvier). The Malayan Weasel. Blanford, p. 171.

Malay name "Anga prau" or "Jelu masak pisang."

General colour golden-ochraceous to tawny, palest towards end of tail. Head, below and above to behind ears, white. Head and body about 13 inches.

The Peninsula.

## Subfamily MELINÆ.

### Genus ARCTONYX.

Body and limbs stout; tail moderately short; ears very short and rounded; soles of feet entirely naked except in hind feet; hair coarse and long with woolly under-fur.

The hog-badgers closely resemble the pigs in their long, mobile and naked snouts which are truncated with the nostrils placed in the terminal disc.

40A.* Arctonyx collaris, F. Cuvier. The Hog-badger. Blanford, p. 178.

Colour dirty grey, slightly washed with blackish above where the long hairs on back and sides have black tips. Head white with variable dark markings but the area surrounding the eye always white. Throat, sides of neck and tail whitish: lower parts and limbs dusky, the latter sometimes black. Head and body about 30 inches, tail 10 inches.

The only record from the Peninsula is that of a pair obtained in Trang by Dr. W. L. Abbott in 1896. The species is well known in Tenasserim and Burmah.

## Subfamily LUTRINÆ.

### Genus Lutra.

Feet round and webbed, claws blunt, head broad and flat, ears small, tail moderate, limbs short, body round and elongated. Upper and lower cheek-teeth five aside, last upper molars very large and square. Fur dense and woolly at base. Aquatic.

Malay name "Mrang-mrang" or "Anjing ayer."

*Key to the Species.*

A. Claws absent or rudimentary; size small L. cinerea.
B. Claws present and well developed.
    *a.* Nose entirely hairy, size large L. sumatrana.
    *b.* Nose naked, upper margin of naked area nearly straight ... ... L. macrodus.

41. Lutra cinerea, Illiger. The Small Clawless Otter, Thomas, P. Z. S., 1889, p. 190. *Lutra leptonyx.* Blanford, p. 187.

Colour brown but slightly paler below. Lips, cheeks from eye to ear, sides of neck and throat whitish. Head and body about 20 inches.

Throughout the Peninsula and Singapore where it is the commonest of the otters.

42.* LUTRA SUMATRANA, Gray. The Hairy-nosed Malay Otter. Blanford, p. 187. Anderson, Zool. Researches, plates X-XII.

Colour brown, the inner sides of limbs and side of head and neck paler. Lips, chin and throat whitish, but the white area not extending to the chest. Head and body about 30 inches.

The Peninsula: Singapore and Langkawi Island.

43.* LUTRA MACRODUS, Gray. The Large-toothed Smooth Otter. *Lutra ellioti*, Blanford, p. 185.

Colour brown, feet paler, abdomen whitish brown. Lips, cheeks to eye, sides of neck, throat and chest whitish. Head and body about 25 inches.

The Peninsula.

(Although *Lutra vulgaris*, the common otter, has been included at times in the Peninsular fauna, there is no satisfactory proof of its occurrence).

## Family URSIDÆ.

### (Bears).

### Genus URSUS.

Feet large, plantigrade with naked soles; claws long and curved, non-retractile; ears small, rounded, hairy; tail very short.

44. URSUS MALAYANUS, Raffles. The Malay Bear. Blanford, p. 199.

Malay name "Bruang."

Colour blackish with a white crescentic patch on the chest and a whitish muzzle and face. Head and body about 50 inches.

Throughout the Peninsula.

## Order UNGULATA.

**(Hoofed Quadrupeds).**

*Key to the Suborders.*

A. A long flexible proboscis ... .. PROBOSCIDEA.

B. No long flexible proboscis

- *a.* Number of toes odd; no pair of lateral horny digits towards the back of the feet PERISSODACTYLA
- *b.* Number of toes even; a pair of external horny digits towards the back of each foot ARTIODACTYLA.

### Suborder PROBOSCIDEA.

**(Long-nosed Ungulates).**

### Family ELEPHANTIDÆ.

(Elephants).

### Genus ELEPHAS.

The elephants are the largest of terrestial mammals and exhibit many peculiarities of structure. The tusks are not enlarged canines but incisors: the bones of the limbs are set vertically above each other and owing to the length of the upper segments the elbow and knee are less enclosed within the body-skin than is the case with other ungulates. A further unusual feature is that when resting the fore-feet are stretched out in front and the hind limbs to the rear. The brain is extremely small and lies far back between the ear-holes. By many zoologists elephants are considered to be closely connected with the rodents.

45. ELEPHAS MAXIMUS, Linn. The Elephant.
Blanford p. 463.

Malay name "Gajah"

Skin nearly naked, blackish grey throughout. An albinistic form occurs. Height at shoulder 8 to 9 feet.

Throughout the Peninsula.

## **Suborder PERISSODACTYLA.**

### **(Odd-toed Ungulates).**

*Key to the Families.*

A. Three digits on each foot; horns above the nose RHINOCEROTIDÆ.

B. Four digits on fore-feet, three on hind; no horns TAPIRIDÆ.

## Family RHINOCEROTIDÆ.

### (Rhinoceroses).

### Genus RHINOCEROS.

The animals of this genus are clothed with a very thick skin which in places grows in folds. Their horns, composed of hardened skin, grow throughout life and if lost are reproduced.

Malay name "Badak."

*Key to the Species.*

A. A single horn on the nose; body practically hairless R. SONDAICUS.

B. Two horns on the nose; body thinly clad with long bristles ... ... ... R. SUMATRENSIS.

46.* RHINOCEROS SONDAICUS, Cuv. The Smaller One-horned Rhinoceros. Blanford p. 474.

Skin practically naked, mosaic-like, folded; blackish-grey throughout. A single horn. Height at shoulder 5½ feet.

The Peninsula.

47. RHINOCEROS SUMATRENSIS, Cuv. The Two-horned Rhinoceros. Blanford p. 477.

Skin thinly clad with long hairs, granular, slightly folded, brownish. Two horns, the foremost largest. Height at shoulder 4 feet.

Throughout the Peninsula.

## Family TAPIRIDÆ.

(Tapirs).

### Genus TAPIRUS.

The Tapirs are stoutly-built harmless animals with the nose and upper lip produced into short non-flexible snout. There are four toes on each fore-foot, three on each hind foot. They are inhabitants of swampy forest and are a notable instance of discontinuous distribution, one species being Malayan and the other four occurring in Central and South America.

48. TAPIRUS INDICUS, Cuv. The Malay Tapir.

Blanford p. 478.

Malay name "Tenoh" or "Badak himpit."

Adults blackish; with rump, upper thighs and tips of ears whitish. The young are striped with black, or brown, and white for the first half year of life. Height at shoulder about 40 inches.

Throughout the Peninsula.

## **Suborder ARTIODACTYLA.**

**(Even-toed Ungulates).**

*Key to the Families.*

A. No upper incisors. Ruminant.
  - *a.* Horns present in males, sometimes in females.
    - *a*¹ Horns permament, a horny sheath on a bony core, unbranched ... ... BOVIDÆ.
    - *b*¹ Horns deciduous, of solid bone, branched CERVIDÆ.
  - *b.* No horns. Size of animal very small ... TRAGULIDÆ.

B. Upper incisors present. Non-ruminant ... SUIDÆ.

## Family BOVIDÆ.

(Hollow-horned Ruminants).

*Key to the Species.*

A. Size large. Horns inserted far apart and growing outwards from sides of head ... ... BOS.

B. Size moderate. Horns inserted near together and growing upwards from forehead ... NEMORHÆDUS.

### Genus BOS.

The wild cattle and the buffalo are large strongly-built animals with naked muzzles and tufted tails and frequently with large dewlaps. There is no excessive difference in size between the horns of the sexes.

*Key to the Species.*

A. Horns round or oval in section.
  - *a.* No distinct dewlap, withers ending abruptly; skull convex between the horns, forehead deeply concave ... ... B. GAURUS HUBBACKI.

*b.* A distinct dewlap, withers ending gradually; skull straight between horns, forehead flat or slightly convex ... ... ... B. SONDAICUS BUTLERI

B. Horns trigonal in section ... B. BUBALUS.

49. BOS GAURUS HUBBACKI, Lydekker. The Malayan Gaur or Sladang. *Bos gaurus.* Blanford p. 484; P. Z. S. 1890, p. 592.

Malay name "Sladang."

General colour brown, almost black in old bulls, rufous in young bulls and cows; paler below. Legs below knees and hocks white. Forehead above eyes often grey or whitish. Height at shoulder 5½ to 6 feet. Horns decidedly curved, tips distinctly twisted inwards with close approach to each other: colour greenish, tipped black. Frontal area between the horns strongly ridged and inclined forward.

The Peninsula.

50.* BOS SONDAICUS BUTLERI, Lydekker. The Malayan Banteng, Lydekker, Field, Vol. CV, p. 151; Jour. F. M. S. Museums Vol. I, p. 61. *Bos sondaicus*, M. & S., Davison, P. Z. S., 1889 p. 447. *Bos sondaicus?* Butler, J. Bombay N. H. S. Vol. XIII, p. 192 and plate.

Malay name "Sapi," "Banteng" or "Tembadau."

General colour blackish in old bulls, rufous in other animals, stockings from below knees and hocks reddish or blackish. No white rump patch. Horns in cows extremely small.

The Peninsula.

The validity of this race or sub-species is at present extremely doubtful. The only actual material on which it is founded is a skull obtained by Captain J. C. Lamprey in Perak and imagined to be that of a cow. The horns are about 6 inches in length. The animal was only discovered after having been mauled by a tiger and was described as being entirely of a rich reddish chestnut colour with no white rump patch and with blackish stockings and muzzle.

The second record is an observation record of an old bull, 18 hands high (!), called by the Malays "Sapio" and described by the late Mr. W. Davison as being black; with belly, inner sides of legs, and stockings chestnut. Forehead rusty grey and inner side of ears strongly tinged with chestnut. (A young bull with this appearance was shot in Jelebu by Dr. E. A. Travers). Juveniles are said to be entirely chestnut and cows to have the chestnut areas darker and richer than bulls.

Finally there is the description of a cow "Sapi" killed at Bukit Kepong on the Muar River in 1850 and described (Oxley, Jour. Ind. Arch. Vol. IV p. 354) as being much like the Bali Island race of *Bos sondaicus* but without the white patch on the buttocks; the horns small, curved inwards, white tipped with black; forehead flat with a tuft of long hair particularly in the bulls; the back curved, the highest point being at about the centre; total height 6 ft. 2 inches; the hair of a brown colour except on the feet which were dirty white; a mane about 2 inches long the whole length of the spine and no dewlap. Misled by the application of the name "Sapi" to it, this animal has hitherto been regarded as a specimen of the Banteng and so added to the uncertainty that already exists with regard to the appearance of the Peninsular form; it was however undoubtedly a Sladang. The absence of white on the rump; the parti-coloured horns, with pale bases and black inward-curving tips; the notable high withers and absence of dewlap are all differentiating features which are possessed by *Bos gaurus* but do not appear in the Banteng. The height given is doubtless a printer's error and should probably read 5 ft. 2 inches.

While the above descriptions indicate the presence of some form of red-legged bovine in the Peninsula there is as yet no certain evidence that they apply to any form of *Bos sondaicus.*

The chief characters of the typical Banteng are (Blanford p. 489):—General colour of old bulls blackish, of cows and young bulls bright reddish brown, approaching chestnut. Stockings below knees and hocks white. A white rump patch. Lips and inner sides of ears white. A pronounced dewlap. Height at shoulder 5 to 5½ feet.

Horns somewhat spreading, tips distinctly twisted forward with slight approach to each other, colour blackish throughout.

50A. BOS BUBALUS, Linn. The Buffalo. Blanford p. 491.

Malay name "Kerbau."

Colour generally greyish black, but there is also a white form. Height at shoulder 5 to 5½ feet. Horns heavy, flattened and transversely wrinkled, varying from almost straight to an almost complete convolution: colour black.

Throughout the Peninsula in a domesticated, and probably also in a feral, state.

### Genus NEMORHÆDUS.

The representatives of this genus are large goat-like animals with slightly curved pointed horns growing upwards in the plane of the face and large stiff manes. The tail is short and hairy, the legs are long and the hoofs moderately large. Hair coarse and shaggy. They inhabit jungle-covered mountains but are occasionally found at sea-level.

### *Key to the Species.*

A. A considerable quantity of red in mane and on the pale patch on the throat ... N. (S.) SWETTENHAMI.

B. Scarcely any red in mane or on the patch on throat ... ... N. (S.) ROBINSONI.

51.* NEMORHÆDUS (SUMATRENSIS) SWETTENHAMI, Butler. Swettenham's Serow or Goat-antelope. Butler, P. Z.

S., 1900, p. 675. *Nemorhædus sumatrensis*, Blanford, p. 515.

Malay name "Kambing gurun."

General colour black, but mane, back and rump appearing grizzled owing to the visibility of the fulvous-white bases of the long hairs: the mane palest. Fetlocks grizzled with fulvous brown and hoofs slightly bordered with whitish. Abdomen and inner sides of thighs fulvous. Muzzle pale: a broad fulvous-white streak continued for a short distance behind the angle of the mouth: throat grizzled fulvous-white: edges and inner side of ears white. Height at shoulder 37 inches, (from type female in the Perak Museum).

The Peninsula but range inknown.

51A.* NEMORHÆDUS SWETTENHAMI ROBINSONI. Pocock. Robinson's Serow. Pocock, P. Z. S. 1908 part 11, p. 185.

This sub-species which has been described from Selangor specimens differs from the last in lacking the red element in mane and throat patch. The distinction is one of very doubtful value and is possibly one due to individual variation.

Known from Perak and Selangor.

## Family CERVIDÆ.

(The solid-horned Ruminants).

### *Key to the Genera.*

A. Antlers short, pedicils long: lateral horny digits small ... ... ... CERVULUS.

B. Antlers long, pedicils short; lateral horny digits large ... ... ... CERVUS.

### Genus CERVULUS.

The barking-deer are moderate-sized animals having, in the males, short antlers with the beam curved inwards at the tip and a very short brow-tine at the base: there are also large upper canines. In females the canine is small and there are mere tufts of hair in place of the antlers. In both sexes there is a marked bony ridge down each side of the face. The lateral toes are much reduced in size externally and all trace of the bony phalanges has disappeared.

52. CERVULUS MUNTJAC GRANDICORNIS, Lydekker. The Large-horned Barking-Deer Lydekker. Field, vol. CIV, p. 780. *Cervulus muntjac*, Blanford p. 533.

Malay name, "Kijang."

General colour tawny, deepest along the back, paler on cheeks and throat. Crown, stripes down face, front of fore-legs, and of hind legs below hocks only, dark brown. Throat, abdomen, inner sides of hind-legs and of fore-legs to knees and two long patches on chest, white. Tail bushy, deep fulvous above white below, (from female from South Johore). Height at shoulder about 22 inches.

### Genus CERVUS.

The only Malayan deer is of large size with antlers longer than the head in the male but entirely wanting in the female. There is a large gland present in front of either eye and the canines are never large. Hair coarse and close: male with an erectile mane.

53. CERVUS UNICOLOR EQUINUS, Cuvier. The Malayan Sambar, Cantor. Jour. As. Soc. Bengal, 1846, p. 271. *Cervus unicolor*, Blanford p. 543.

Malay name "Rusa."

General colour dull brown, slightly paler below: females are brighter. Height at shoulder 4 to 4½ feet. The antlers are normally three-tined.

Throughout the Peninsula and Singapore.

## Family TRAGULIDÆ.

(The Chevrotains or Mouse-deer).

### Genus TRAGULUS.

The Mouse-deer are small animals, entirely hornless but with long sharp canines present in the upper jaw of the males. The lateral horny toes are well-developed and there is a bare glandular patch on the under-side of the mandible. They are forest dwellers of crepuscular habits.

The animals of this genus form two very distinct groups—the Napu and the Plandok; the members of the latter being much the smaller in size: their total length (tip of nose to end of tail) being rarely more than the head-and-body length of the others.

*Key to the Species.*

A. Size larger; white outer throat stripes either broken or much deflected in centre.
  a. General colour yellowish-ochraceous: nape stripe distinct ... T. (JAVANICUS) CANESCENS.
  ... T. (C.) UMBRINUS.
  b. General colour bright-tawny: nape stripe obsolete ... T. (J.) RUFULUS.
B. Size smaller; white outer throat stripes running unbroken and straight from jaw to shoulder.
  ... T. (KANCHIL) RAVUS.
  ... T. (R.) LANCAVENSIS.
  ... T. (R.) RAVULUS.

54. TRAGULUS (JAVANICUS) CANESCENS, Miller. The Larger Mouse-deer or Napu. Miller Proc. Biol. Soc. Washington, 1900, p. 185. *Tragulus napu*, Blanford, p. 557.

Malay name "Napu" and "Munkonong."

Clouded with black throughout except throat stripes, chest, part of abdomen and front of thighs which are pure white. Back ochraceous fading to creamy white on sides. Fore-legs like back but less blackened, a patch of clear fulvous on hind-legs. A dark stripe along top of head and nape, expanding on the crown. Area between posterior neck stripes blackish, centre of abdomen like sides. Under side of tail white. Head and body about 22 inches.

Throughout the Peninsula and Singapore.

55. TRAGULUS (CANESCENS) UMBRINUS, Miller. The Lankawi Napu, Miller, Proc. Biol. Soc. Washington, 1900, p. 191.

Like *T. canescens* but smaller, yellower and darker. Colour pattern closely resembles the mainland form but is more clouded with black. Back ochraceous, sides buffy, nape-stripe less defined, dark area on throat more extensive and white of abdomen more confined. Head and body about 20 inches.

Langkawi Island: and also Teretau Island, specimens from which do not appear to be separable.

56. TRAGULUS (JAVANICUS) RUFULUS, Miller. The Tioman Ruddy Napu. Miller, Proc. Washington. Acad. Sci., 1900, p. 227.

General colour bright tawny tinged with red on the rump, and becoming ochraceous on the sides, purest on the neck and dullest on the face. Back and sides clouded with black. Upper nape stripe obsolete. Throat stripes, chest, inner sides of limbs, abdomen and under side of tail white. Centre of abdomen pale ochraceous. Head and body about 20 inches.

Tioman Island.

57. TRAGULUS (KANCHIL) RAVUS, Miller. The Small Mouse-deer or Plandok. Miller, Proc. Biol. Soc. Washington,

1902 p. 174. *Pragulus javanicus*, Blanford p. 556.

Malay name "Plandok" or Kanchil.

Back and sides ochraceous-buff heavily clouded with black, palest on sides. Fore-legs, shoulders and sides of neck, scantily clouded ochraceous, purest on legs. Thighs tinged with ochraceous. Face like back; a black stripe along nape from ears expanding on the shoulders. Throat stripes, chest, abdomen, inner sides of limbs and under side of tail pure white. Area between throat stripes a grizzle of black and ochraceous continued in a narrow line down chest to abdomen where it expands becoming ochraceous buff. Head and body about 18 inches.

The Peninsula and Singapore.

58. TRAGULUS (RAVUS) LANCAVENSIS, Miller. The Lankawi Plandok. Miller, Proc. Biol. Soc. Washington, 1903, p. 41.

Like *T. ravus* but yellower and much lighter owing to the lesser quantity of the black element. Dark nape stripe almost obsolete.

Colour pattern similar to the mainland form but back less clouded, limbs and tail more fulvous. Under parts more ochraceous and dark throat-area less grizzled. Head and body about 18 inches.

Langkawi Island.

59. TRAGULUS (RAVUS) RAVULUS, Miller. The Adang Plandok. Miller, Pro. Biol. Soc. Washington, 1903 p. 41.

Like *T. ravus* but smaller, neck paler and nape-stripe less clearly defined.

Back and sides light ochraceous-buff clouded with black which is slightly in excess above. Neck lighter ochraceous than in the mainland form. Head and body about 18 inches.

Pulo Adang, Butang Islands.

## Family SUIDÆ.

(Pigs).

### Genus SUS.

The pigs possess four completely developed toes and an elongate narrow snout terminating is a flat disc wherein are the nostrils: the upper canines are curved outwards and upwards and in the boars often attain a very large size. They are furnished with upper incisors and the lower incisors project almost horizontally. A crest or mane runs along the greater portion of the back and the body is scantily clad with coarse bristles.

A. Last lower molar with at least three cross ridges and a large terminal heel ... ... S. JUBATUS.

... S. (J.) JUBATUTUS.

B. Last lower molar with not more than three cross ridges the posterior being often reduced to a single median tubercle ... S. PENINSULARIS.

60.* SUS CRISTATUS JUBATUS, Miller. The Malayan Maned Pig. Miller, Proc. U. S. Nat. Museum, vol. XXX, p. 745. *Sus Cristatus*, Blanford, p. 560.

Malay name "Babi utan."

General colour blackish, variably grizzled with brown and whitish: a light area behind the angle of the mouth. Mane well developed, ear only slightly fringed.

Posterior molar (wisdom tooth) in lower jaw with at least three cross ridges and a large terminal heel representing a modified fourth cross ridge and with small cusps situated centrally between these ridges in addition.

Height at shoulder about 30 inches, upper length of skull 15 inches.

The Peninsula but so far only known from Lower Siam and the more northern parts of the F. M. S. Limits of range not definitely ascertained.

61. SUS (JUBATUS) JUBATULUS, Miller. The Island Crested Pig. Miller, Proc. U. S. Nat. Museum, vol. XXX, p. 746.

Like S. *jubatus* but smaller and with posterior molars slightly more complicated. Height at shoulder about 26 inches, upper length of skull about 12½ inches.

Teretau and Langkawi Islands off the West Coast.

62.* SUS (VITTATUS) PENINSULARIS. The Peninsular Striped Pig. Miller, Proc. U. S. Nat. Museum, vol. XXX, p. 749.

Malay name "Babi utan" or Babi bakau."

Like *Sus jubatus* but with a notable sprinkling of reddish bristles on the posterior half of back.

Compared with the other pigs of this region it is immediately recognisable by the reduced condition of the last molar; in the lower jaw it may terminate abruptly at the third cross ridge which is often reduced to a single median tubercle, or a minute supplemental tubercle may occur behind this ridge.

Height at shoulder about 28 inches, upper length of skull 13½ inches.

This is the largest member of the *vittatus* group of island pigs and is the only one found on the Asiatic mainland where it is known at present from Johore and Muar but the line where it meets with the representative of the continental *cristatus* animal is not yet defined. The Singapore wild pig is probably of this species.

# Plants of Prince of Wales Island.

*From a MS. in the British Museum.*

BY SIR WILLIAM HUNTER,

Surgeon to the East Indian Company.

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## *INTRODUCTION.*

The author of this manuscript now preserved in the British Museum was Sir William Hunter, Surgeon to the East India Company. He was born in 1755 and was trained for the medical profession. Being appointed doctor to an East Indiaman he started for the East but his ship met with an accident in the Syriam river in Pegu, being dismasted in rough weather. During the delay for repairs Hunter collected materials for his work, "A concise account of the Kingdom of Pegu," which was published in 1785. He became assistant-surgeon to the East India Company in Bengal in 1783, and Surgeon in 1794. From 1798 to 1802, and again later he was Secretary to the Asiatic Society of Bengal. After the capture of Java by the English in 1811 he was appointed Superintendent Surgeon there, and died at Batavia in 1812.

Hunter was a very versatile author, writing papers (chiefly published in the Asiatic researches) on a variety of subjects. Besides the account of Pegu, he published a number of papers on Botanical and Astronomical subjects, an essay on the diseases of Lascars on long voyages, and a Hindustani-English dictionary. He seems to have visited Penang in 1802 or early in 1803 when he wrote this manuscript which has not hitherto been published, and about the same time he must have written his account of Gambier cultivation, which was published in the Transactions of the Linnean Society IX p. 218 and read in England in 1807.

In this manuscript he gives first an account of Penang as it was at the time of his visit and an account of the plants he met with. This interesting as showing the early date of the introduction of many useful plants into Penang through the East Indian Company, who then possessed spice gardens, cultivated for the purpose of introducing spice plantations to the English colonies and to break down the monopoly of the Dutch. In this manuscript we have the records of the first fruiting of the nutmeg and mangosteen in Penang. An account of the cultivation of pepper was published by Hunter in the Asiatic Researches Vol. IX 1809 and is very much the same as what is written by him here, but as the original published paper is rare and difficult to procure now, it is well worth reprinting from his manuscript.

I have identified most of the plants described by Hunter in this paper, but there are several I have been only able to guess at from description. He seems to have made a number of drawings of his plants to which there are references in the manuscript, but I do not know what has become of these drawings.

Reference is made in many parts of the manuscript to the spice gardens of the Honourable East India Company and the locality given for these the first Botanic Gardens in the Straits Settlements is recorded definitely for the first time *viz.* at Ayer Hitam. The stories of these gardens is this. On the settling of the island by Captain Light in 1786, there were practically no cultivated plants there except a few coconuts and fruit trees. The East India Company, anxious to break the Dutch monopoly of spices, appointed Christopher Smith their Botanist in 1794, and sent him in 1796 to the Moluccas to collect plants of spice trees. He sent from Amboyna 71.266 nutmegs and 55.264 clove-plants and quantities of canary nuts (*Canarium commune*), and the sugar palm, *Arenga saccharifera*. These were grown (except for a number sent to Kew, India and the Cape) in the spice-gardens at Penang. He probably sent also the other ornamental and useful plants mentioned as introduced from Amboina. After his return he was appointed in 1806 Superintendent of the Botanic Gardens and died about the same year.

The gardens founded for the Government in 1822, also at Ayer Hitam, were probably on the same spot, but to this we have no clue. A botanical School-master, George Porter had charge of them till 1834 when they were sold cheap by Governor Murchison, as his wife could not get enough potatoes and other vegetables from them for her table, it is said.

Names of plants etc. within brackets (—) are added by myself, otherwise the manuscript is not altered.

H. N. RIDLEY.

*To*
*His Excellency*
THE MOST NOBLE
MARQUIS WELLESLEY,
Governor General, &c., &c.

This Outline of a Flora of Prince of Wales Island,
(Penang),
is most respectfully presented,

*By*
*His Lordship's*
*Most obedient and very humble*
*servant,*

(*Signed*) WM. HUNTER.

# Plants of Prince of Wales Island.

Prince of Wales's Island is of a form nearly rectangular, its length from North to South being about eleven or twelve miles, and its breadth, from East to West about half that space. Its North-east point, on which stand George Town and Fort Cornwallis, is in Lat. 5°25′ N. and Long. 100°18′ east. It is divided into an easterly and westerly region, by a ridge of hills, extending through nearly its length. On the highest part of the ridge, is erected a flag-staff, for notifying, by signal, the appearance of ships at sea. The height of this peak, (if it may be called so as the table is about eighty yards in length) has been variously estimated; and all the conjectures I heard on the subject were beyond the truth. To ascertain it, I measured a base of 670 feet, on a plain, as near as could be obtained to the bottom of the hill, which gave the perpendicular height of the highest point 1192 feet. The length of the flag-staff on the hill is fifty feet. This, being viewed from a Bungalow in George Town, through a three foot reflecting telescope, and measured by an object glass micrometer attached to the telescope, was found to subtend an angle of 6′ 54″, giving the distance, in a straight line, about $4\frac{2}{3}$ miles.

The table land on the top of the hill runs from North to South. On the North extremity is the flag-staff, and on the South, a Bungalow, belonging to the Lieutenant Governor. There are two roads cut in the side of the mountain, for ascending to the summit, one from the South-ward, and another from the North-ward. The last of these was finished during my stay on the Island. It is something longer than the former, but of much easier ascent; and the bottom of this road being nearer to the town than the other, the whole journey, from town to the top of the hill, is considerably shortended by it. About half way up these two roads unite, so that the upper part is common to both.

The forest trees, by the road-side, have the lower part of their trunks, for above five or six feet above the ground, formed into projecting and re-entering angles, so that a transverse section of one of them would resemble a star. Thence it ascends, round and perfectly straight, without branches, to a great height, perhaps above one hundred feet. The branches at top are pretty much crowded, but that top is small, in proportion to the size of the tree. This form seems to be occasioned by the trees growing so close together that there is not room for the branches to spread wide.

The lofty forest overhead, forming an impenetrable shade, the mountain on one hand, and a rugged precipice on the other, the murmuring of a stream in the valley below, with the song of a few birds, and the perpetual shrill hum of numerous beetles, have a striking effect.

The view from the hill, to the North and South is very extensive over the sea. To the East, it is bounded by a very lofty ridge of mountains on the Malay continent. This ridge is not seen from the plain ; being concealed behind a nearer chain, of much less elevation. To the West-ward is a hill, somewhat higher than that whereon the Bungalow and Flag-staff are erected. This intercepts the view of nearly one fourth part of the horizon, that is from N. 65 W. to S. 32 W. So that, if it should be requisite to notify at Fort Cornwallis, the appearance of ships between these points, it must be done by erecting a second flag-staff on the Western hill, the signals on which should be repeated from that to the east-ward.

Immediately to the West-ward of the ridge which joins the Bungalow and flag-staff, is a deep valley to which a kind of road has been formed by cutting the sides of the hill into steps and supporting them with sticks laid across. This valley enjoys a perpetual shade ; and at the bottom is a slender stream of very clear and cool water, which running under large masses of rock, is collected in a little bason. The water is hard, from some saline, or mineral impregnation, which I had not the means of examining.

About half a mile farther on, in the valley which contains the beginning of the new road up the hill, is a cascade, formed by a small river, precipitating itself from the mountain. This river winds through the valley, and the road crosses it five times, by means of wooden bridges. The lowest fall is not above twenty feet in height the water limpid as crystal, and always cool. Thence, by a steep and winding ascent, amid thick forest, you come to the foot of the great fall, the height of which has been reckoned two hundred feet, though I suspect this estimate of exaggeration. However, the fall of no despicable stream, from such an elevation, skirted on both sides with most luxuriant foliage, forms an object at once pleasing and sublime. Although the air in the wood, when I first visited it, was exceedingly close; yet on approaching the bottom of the fall, I found it so cold, that I was glad to make a speedy retreat, being apprehensive of bad effects from such a sudden change of temperature when heated. The water is perfectly sweet and well tasted. This river, called the *Waterfall river*, after quitting the valley, takes its course to the South-ward, and joins its stream to another, the *Ayer Hitam* (or black water) which comes from the South-ward. The united trunk, called the *Penang River*, falls into the harbour about two miles to the South-ward of George Town; and from this place, ships are generally supplied with water. But, as far as their boats are able to navigate the river, its water is said to be slightly brackish; on which account, it has been proposed to conduct the purer stream of the Water-fall, by pipes, to George Town for the use of shipping as well as of the inhabitants.

The harbour is formed by the strait, intercepted between the Island and the Malay shore. For capacity and security from tempests, it is hardly inferior to any in the World. But its advantages have been so ably detailed by Sir Home Popham, that I cannot pretend to add anything to the information contained in his report. Whether it is capable of being fortified, so as to be tenable against the temporary superiority of an enemy at sea; and, if so, what are the best means of effecting that purpose, are questions that have undergone much discussion, and still remain unanswered.

The forests produce a great variety of timber for the construction of ships, as well as houses, and for household furniture. I have seen specimens of about thirty different kinds, but was able to ascertain the botanical characters of very few. From their great height, and the larger circumference of the trunk, it is very difficult to climb the large trées, so as to obtain the flowers. These can only be got, either by cutting down the trees, or by tying bamboos along their trunks, to climb upon. Colonel Kyd, in his reports, has given the names of some of the trees, and mentioned the properties of the timber which they yield. But the timber of those trees has yet been seen in most instances to disadvantage, as they have never been allowed time enough to be seasoned.

On the eastern side of the Island, or that part intercepted between the hills and the harbour, almost all the great timber has been cut down; but much ground still remains to be cleared of underwood and planted. The soil is various. In low valleys, nearly surrounded by hills, there is much vegetable mould; on higher spots and extensive plains, we find a stiff red clay, mixed with sand.

The chief article of cultivation is pepper. Large groves of Betel-nut and Cocoa-nut have also been planted, as these trees require but little labour. Almost the only grain raised on the Island, is rice, and that in very small quantity. The price of labour is here, as in all newly settled countries, excessively dear; and therefore crops of small value will not defray the expense of cultivation.

The eastern side of the Island is divided into districts, in the following order commencing from the north.

*Poolo-Tikoos;* a narrow plain, rather elevated, and open to the sea.

*Poolo Penang;* extensive plain, containing many plantations of pepper and betel-nut.

*Ayer Hitam;* a valley, inland, and surrounded on three sides, by hills. In this are situated the Honble. Company's spice plantations. In the parts of this valley which lie near the banks of the river, is some of the richest soil on the Island.

*Batoo Lanshun;* receives it name from a hill, of no great elevation, close on the shore of the eastern straits; which commands a most interesting prospect of the town, the harbour, and almost the whole eastern plain.

*Soongey Groogur;* a small district, of very uneven surface.

*Soongey Dooa ;* In this district, near the shore, is another beautiful hill, the sides of which swell very gently, and the summit has a view of the whole strait, as well as of the adjacent country.

*Soongey Neebong ;* so named from a kind of palm. The road through this district is difficult, consisting of steep ascents and descents, winding among the hills. In this district is a considerable plantation of Nutmeg and Clove trees, belonging to the estate of the late Mr. Roebuck.

*Soongey Clooan ;* This district is the richest and most completely cultivated on the Island. It contains the oldest and best Pepper plantations. Here is a large plantation of betel-nut forming on account of the Honourable Company. Opposite to the north-west point of the Island is the small island *Poolo Tikoos* (or Rat Island). It is rocky, almost bare of vegetation, but produces plenty of oysters.

Within the straits are the islands Poolo Juraja and Poolo Kra; and at the southern extremity lies Poolo-Remoo, or Tiger Island. All these are woody. On Poolo Juraja is found good lime-stone, and a reddish clay, which being mixed with sand, and spread on the roads, forms an excellent hard surface.

The climate, as might be expected so near the equator, admits of little variety of seasons, in respect to heat and cold. And these depend, not so much on the meridian zenith distance of the sun, as on the variety of dry or rainy weather. The following abstract of a register of the thermometer for ten months, will show the extent of its variations.

| | MORNING | | NOON | | EVENING | |
|---|---|---|---|---|---|---|
| | from | to | from | to | from | to |
| April | 80 | 84 | 80 | 87 | 80 | 86 |
| May | 79 | 83 | 80 | 86 | 80 | 84 |
| June | 80 | 83 | 80 | 86 | 80 | 84 |
| July | 79 | 83 | 81 | 86 | 80 | 84 |
| August | 77 | 82 | 79 | 85 | 78 | 83 |
| September | 78 | 82 | 78 | 84 | 78 | 84 |
| October | 78 | 81 | 78 | 84 | 78 | 82 |
| November | 76 | 80 | 78 | 84 | 78 | 81 |

| | MORNING | | NOON | | EVENING | |
|---|---|---|---|---|---|---|
| | from | to | from | to | from | to |
| December | 75 | 80 | 80 | 86 | 76 | 82 |
| January | 75 | 78 | 85 | 91 | 77 | 82 |

In the months of September, October and November was much heavy rain. From the middle of December, to the beginning or middle of March, is the driest Season. The heat in the middle of the day then rises high, but the nights and mornings are cool. During the remaining six months, frequent showers fall, which cool the air, but there is no heavy or long continued rain. In clear weather, the morning from a little after sun-rise, till ten or eleven o'clock, is usually sultry: but about that time, the sea breeze sets in, to temperate the heat, and restore the elasticity of the atmosphere. And it is remarked that exposure to the sun after that hour, is less hurtful than before.

The temperature on the top of the hill is at all times about ten degrees lower than that on the plain. Hence, during the dry season, convalescents derive great benefit from a residence on the hill; the journey to which from the Town, may be performed in one hour and three quarters. But in rainy weather the hill is frequently enveloped in a thick fog, which is hurtful to invalids. A fog is hardly ever known to reach the point on which the Town is built.

For some years after his Island was ceded to the English Government, during the process of cutting down the woods and clearing the ground, the place was found to be unhealthy. Fever and dysentery, with obstructions of the liver and spleen were prevalent and often fatal. But at present, there is probably no Settlement in India where Europeans enjoy better health, or can endure with impunity more exposure to the vicissitudes of the weather.

The number of inhabitants may be safely estimated at 20,000. Of these at least one third are Chinese, who are divided into two classes. Those from the province of Canton are chiefly artificers, and the people from Chin-chew are employed in the cultivation of the ground. These two classes cannot understand each other's language and an antipathy prevails between them, as great as between the natives of two hostile kingdoms.

The *Choolias*, a race of musulmans from the Southern part of the Coromandel Coast (above Nagore especially) may be reckoned to form another third. Many of these are engaged in trade; the boatmen, fishermen, and coolies, who carry burdens are all of this class.

The remaining third is chiefly composed of Europeans, Armenians, Portuguese Malays and Burmas. The concourse of various nations is so great, that I have been assured that fourteen languages are in constant use in the Bazaar; English, Portuguese, Armenian, Chinese of Canton, Chinese of Chinchew, Buzguese Malay, Siamese, Hindostanee, Bengalee, Tamil, Telinga, Arabic, Burma.

The vegetable productions which have fallen under my observation are as follows :—

## MONANDRIA—MONOGYNIA.

*Canna Indica*-cultivated in gardens.

1. *Amomum zingiber*, Ginger, Alia, Malay.

Cultivated, nearly sufficient for the use of the inhabitants.

2. *Amomum globosum ?* Loureiro Flor. Cochinchin, p. 4. *Amomum nutans*, Roxb. [*Alpinia* sp. Ed.]

Spike: cauline, branched; fruit globose, with an even suface. Boonga Chungkenam, Malay.

### *Description.*

Root: tuberous, fibrous. Stems: erect, cylindrical, smooth, porous, lamellated. Leaves: alternate, lanceolate, large, smooth, without nerves. Petioles: long, vaginant, continued large, from the lamella of the stem. Stipule: a membranaceous margin, toothed at the apex of each petiole within the base of the leaf Racemi of Flowers: terminating the stem drooping. Peduncles: sparse; the lower three flowered, the upper two flowered. Calyx: Perianth above, one leafed;

mouth three toothed. Corol: One petaloid, funnel shape, irregular; tube dilated at the throat, declining. Limb three parted, with divisions ovate, twice as long as the calyx, white; the upper larger. Nectary, one leafed, petal form, trapeziform, concave, declining; the length of the Corol; without of a whitish yellow; within yellow with scarlet spots: arising from the throat of the tube together with the lower division of the Corol. Stam: Filament one, broad, inside plain, three furrowed, outside convex, smooth; erect, shorter by one half than the Corol; arising from the throat of the tube, together with the upper division of the Corol. Anther oblong, erect, inside deeply furrowed; emarginate. Pist: Germ below, globular, tomentose, crowned with a glandular corpuscle, which is cylindrical and furrowed towards the upper division of the Corol. Style thread form, longer than the stamen; embraced by the furrow of the Anther. Stigma funnel form, with an ovate mouth.

I have not seen the fruit, but judge it to be the same with Loureiros' plant, from the agreement of the other parts. The infusion of the root is used by the Malays as a stomachic.

3. *Amomum filiforme*, H. (*Hedychium coronarium*, L.).

Spec. Diff. Stem two edged; spike terminal, oblong, nodding; scales spathulate, two flowered; leaves lanceolate, most entire, smooth.

*Description.*

Stem: herbaceous, two feet in height, erect, two edged, smooth, porous, lamellated, formed of the petioles of the leaves, vaginant, equitant. Leaves: alternate, lanceolate, most entire, smooth, without nerves, stipule: a membranaceous margin, at the apex of each petiole, within the base of the leaf. Spikes terminal, oblong, nodding. Flowers in pairs, sessile, white, sweet-smelling. Calyx spathe (or scale) spatulate, rolled up into a cylinder, two flowered; the flowers spreading successively. Proper perianth tubular, splitting at the side, mouth three toothed, with toothlets lanced. Cor: one petaled; Tube three times as long as the calyx, thread form, erect, a little reflected, limb six cleft; the upper division large, roundest emarginate;

the two lateral obliquely ovate, the three alternate, outer, linear; all spreading. Stam: filament one, linear, below convex, above channelled, ascending, a little longer than the corol; arising from the throat of the tube, at the base of the lower division. Anther oblong, erect, channelled above, with a double pollen bearing line. Pist: Germ below, obtusely three cornered; crowned with a gland, conical, two cleft, style capillary arising at the base of the gland, towards the lower side; concealed within a furrow in the lower side of the tube and of the stamen. Stigma funnel shape, very small, at the tip of the anther.

I have not seen the ripe fruit, and believe it does not bring its seed to perfection at Prince of Wales's Island. It is cultivated in gardens for the beauty and perfume of its flowers.

According to Dr. Roxburgh's arrangement of the scitamineous plants, this will be a *Koempferia*, and approaches very near to, if it be not the same with his *Koempferia speciosa. Gandsulium*, Rumph. 5, t. 69, f. 3. *Hedychium coronarium*, Koen. ap. Retz. Fasc. 3, No. 20, p. 73, Willden p. 10.

In mine the tube of the corol is longer and more slender; and the divisions of its exterior limb are linear.

4. *Amomum taraca*, Roxb.

"Leaves sub-petioled, oblong; panicle terminal; interior division of the corol two lobed, with lobes emarginate and curled." *Hellenia allughas*, Willden p. 4. *Heritiera allughas*, Retz. obs. fasc. 6, p. 17, t. 1. This is also called by the Malays Ghungkenam. The fruit very hot and fiery. The root pounded is applied as a remedy in Tinea capitis.

### CURCUMA.

*C. longa*, Turmeric. Mal. Koonhut. Cultivated.

## DIANDRIA—MONOGYNIA.

### ERANTHEMUM.

Leaves: in threes round the stem, lanceolate, smooth, spikes verticelled, axillary and terminal; verticles three flowered.

Corol: two lipped, three and two cleft. Anthers: double; two small barren stamens between the fertile ones. It agrees with the *Eranthemum diantherum* of Dr. Roxburgh in everything except the three fold leaves which may be an accidental luxuriancy.

### JUSTICIA.

1. *J. picta*, Tsjude-maram. Hort. Mal. 6, t. 60. Folium bracteatum, Rumph. 4, p. 73, t. 30. (*Graptophyllum hortense* Nees.).

Cultivated; a variety has the leaves of dark brown, not variegated.

2. *J. involucrata*, Roxb. Cultivated in a Garden.

## TRIGYNIA.

### PIPER.

1. *P. nigrum*, Black pepper.

Leaves ovate, acuminate, 5 to 7 nerved, smooth; petioles short. Melago codi. Hort. Mal. 7, p. 23, t. 12. Marsden's Sumatra p. 105. Malay: Ladda.

This plant has been so fully described, that I have nothing to add on that head. But as it is the most important article of produce on Prince of Wales's Island, the manner of cultivation pursued there merits a particular detail.

It is propagated by cutting, or suckers. These are generally planted at a distance of about 7½ feet; that is 1,000 plants in an Oorlong, which is a measure of 80 yards square, nearly equal to 1⅓ acre. But some experienced cultivators think that the distance should be greater; perhaps nine feet; as the roots would be better nourished and the produce more abundant.

When a plantation is to be commenced, the large timber is cut down by Malays, at the rate of five dollars per Oorlong. The remaining labour is performed by Chinese, who dig out the roots, burn them and the trunks, pulverise and level the soil, plant the pepper vines and the trees which are to support them. It is usual to contract with them for making the plantation in this manner, and taking care of it for three years, at the end of which time it is in bearing at the rate of 225 dollars for 1,000 plants. The sum is liquidated by instalments, as the contract requires it, to pay his workmen. Something more than one third is paid in the first year, because the labour is then greatest; but about one fourth of the whole is generally reserved, till the contract is completed, and the plantation delivered over. This does not include the price of the plants, or cuttings, which are found by the proprietor of the plantation.

The vine is first made to climb on a pole. At the end of ten or twelve months, it is detached from the pole, to undergo the process called laying down. A circular hole, about eighteen inches in diameter, is dug at one side of the plant. At the bottom of this the plant is carried round in a circle, and the end of it is brought to the tree which is in future to form its support. The depth of the hole, in which the vines are laid down, varies, according to the situation and nature of the soil; and much judgment, to be acquired by practice, is requisite, to adapt it to these circumstances. In high and dry situations, the depth must be considerably greater than in those which are low and moist. Too little depth in the former would expose the roots to be parched in dry seasons; and too much in the latter would occasion them to rot, from excess of moisture.

The trees used for supporting the pepper vines on Prince of Wales's Island are the *Morinda citrifolia* (Munkoodu) and the *Erythrina corallodendron* (Dudup). The Chinese planters alledge that the pepper supported by the Erythrina thrives better, and lasts longer than that supported by the Morinda. One instance I heard quoted in proof of this assertion, was a plantation which had long been neglected, and overgrown with weeds. When it came to be examined the vines which had grown on the Morinda were all dead; while those on the Erythrina were still strong and productive. The reason assigned by the planters, for the difference is, that the roots of the Erythrina do not spread so much, or penetrate so deep as those of the Morinda; whence they interfere less with the pepper, and do not draw so much nourishment from the earth.

The Morinda was formerly made to grow with one stem, but this was not found to afford sufficient spread for the vines. Therefore when that tree is used, the practice now is to break off the principal stem, at a height of about two feet from the ground. This obliges the trees to put out lateral branches at that height. When these have attained a length of about a foot or fifteen inches, they are cut off. From their end arise erect shoots each of which forms a stem, so that the vine has four or five stems to climb on, instead of one.

The vines, at three years of age, begin to produce, and they are reckoned to be in full bearing at five or six. They continue nearly in the same state for eight years more, or till they are fourteen years old. From that period they are reckoned on the decline; but the planters on Prince of Wales's Island cannot yet judge from experience at what rate, or in how long a time they decay. Some Chinese, who have cultivated the plant, on the Malay coast, say the vines have not arrived at their point of greatest produce till they are fourteen years old; that from this gradually declining, they continue bearing till near thirty.

The first year of bearing, or at three years old, the vines do not yield more than half a catty each. But plants kept in good order, when in their prime, will produce three catties. A plantation of 3,000 vines at *Soongey Clooan*, now in its eleventh year, has been let for three years at seventy picols yearly, or at the rate of $2\frac{1}{3}$ catties each plant. It must therefore produce as much more as will pay the tenant for his labour and risk. They are generally let for the first five years of bearing, or from three to eight years old, at 160 picol per Lukcha (10,000) or at 160 catties for 100 vines.

The vines yield two crops yearly. The first gathering commences inDecember, after the heavy rains are over; and at the same time, the vines have put out new flowers. This first collection may be finished in February. The flowers which spread in December have ripened their seeds in April or May. The second collection then begins, and ends in July.

During this time blossoms have expanded, which are to furnish the crops of next December. But, with the most careful cultivators, who gather only the bunches which are fully ripe, these two harvests run so nearly into one another, that the collection is in a manner continued without interruption, from December till August; so that there is only an interval of four months in the year, which is the season of the heavy rains.

The bunches are plucked off entire, taking care to pull only those that are ripe. They are thrown into baskets, and allowed to remain for a day. Then they are spread on mats, and trodden with the feet, to separate the fruit from the stalk. The grain is then winnowed, to clear it from the stalks and the lighter grains; and then the good heavy grains are spread on mats, in the sun, to dry, for three days. It is calculated that one hundred catties of green pepper, with the stalks, yield thirty five catties of clean and dry pepper. The collection of one day from 46,000 plants of three years old, was 500 catties of green, or 175 of dry pepper.

It is usual, as was before noticed, when the plantation is delivered over to the proprietors at the end of three years, to let it to a Chinese farmer for five years more; as the proprietor is thereby less liable to imposition, the only precaution necessary being to see that the tenant is careful of the vines during the last year, and leaves them in good condition at the expiration of the lease. This is the only way in which an extensive plantation, or one whereon the proprietor cannot bestow his whole attention, can be managed to advantage. But, if the proprietor has time, and is careful and acute, he may render it something more productive, by keeping it in his own hands. The labour of cleaning the vines, throwing up earth about the roots, and collecting the produce of the plantation above mentioned, of 46,000 plants, was performed by sixteen Chinese workmen.

In an Appendix to a letter from the Superintendent of Prince of Wales's Island, dated 12th of November 1796, is an estimate, whereby it would appear that a plantation of 100,000 vines should yield, at the end of twelve years, a clear profit to the proprietor, of 153,000 Spanish dollars. But the value of the pepper is stated too high at 14 dollars per picol; and the interest of money, on both sides of the account, is neglected. Yet if we value the pepper only at ten dollars for which it is presumed it may always be sold on the field, and compute the interest, the result will give an advantage, exceeding the Superintendent's calculation, by 31,000 dollars. See Appendix A.

The whole quantity of pepper produced last year on the Island, was estimated at something between sixteen and twenty thousand picols. Taking the medium quantity at 12 dollars, which was the selling price, this article must have amounted to 2,16,000 dollars. The pepper is more esteemed than that which comes from the Malay continent and Sumatra, and it sells for about one dollar more per picol. The difference is occasioned by the haste of the Malays to gather the fruit before it is sufficiently ripe.

## *APPENDIX A.*

*Estimated expense and produce in 12 years, of 100 Oorlongs, planted with Pepper.*

| | DR. | CR. | BALLANCE. |
|---|---|---|---|
| | Sp. Drs. Pa. | Sp. Drs. P. | Sp. Drs. P. |
| 1st Year, Clearing of heavy timber by Malays at 5 Drs. Oorlong ... ... ... | 500 | | |
| To the Chinese contractor, in the course of 3 years, when he engages to deliver the Plantation in full bearing, @ $22.50 per 1000 plants ... $22,500.00 | | | |
| Of this in the first year 8437.50 ... ... ... | 8437.50 | | 8,937.50 Dr. |

| | | | | |
|---|---|---|---|---|
| 2nd Year, Farther payment to contr. ... | 4218.75 | 4218.75 | | |
| Interest of 1st year at 12% | | 1072.50 | | 14,278.75 Dr. |
| 3rd Year, in full to contract ... | 9843.75 | 9843.75 | | |
| | $22,500.00 | | | |
| Interest in the 3rd Year ... | | 1707.45 | | 25,779.95 Dr. |
| 4th Year, Interest ... | | 3093.59 | | |
| Supposing the Plantation to be let, during the first 5 years of bearing, at 160 Picols per Lacsha, this will be 1600 Picols; which may be sold on the ground at 10 Drs. ... ... ... | | | 16,000 | 12,873.54 Dr. |
| 5th Year, Interest ... | | 1544.82 | | |
| 5th Year's crop ... | | | 16,000 | 1,581.64 Cr. |
| 6th Year's Interest ... | | ... | 189.80 | |
| 6th Year's crop ... | | ... | 16,000 | 17,771.44 Cr. |
| 7th Year, Interest ... | | ... | 2,132.57 | |
| 7th Year's crop ... | | ... | 16,000 | 35,904.01 Cr. |
| 8th Year, Interest ... | | ... | 4,308.48 | |
| 8th Year's crop ... | | ... | 16,000 | 56,212.49 Cr. |
| 9th Year, Interest ... | | ... | 6,745.50 | |
| The plants being now in full vigour, may be let for four years more at 2 Catties each plant, or 2000 Picols; which is ... ... ... | | ... | 20,000 | 82,957.99 Cr. |

| | | |
|---|---|---|
| 10th Year, Interest ... ... | 9,954.96 | |
| 10th Year's crop ... ... | 20,000 | 112,912.95 Cr. |
| 11th Year, Interest ... ... | 13,549.55 | |
| 11th Year's crop ... ... | 20,000 | 146,462.50 Cr. |
| 12th Year, Interest ... ... | 17,575.50 | |
| 12th Year's crop ... ... | 20,000 | 184,038.00 Cr. |

2. *Piper betle.*

Leaves obliquely cordate, acuminate, waving, seven-nerved, smooth. Willden p. 15. Betela-codi Hort. Mal. 7, p. 29, t. 25. Mal. Seeree.

Of this the Malays reckon five varieties, among which are these three, Seeree Malayo, Seeree Cheena, Seeree Oodang. The specimen of which the leaf is above described was the Seeree Cheena. The Seeree Oodang, they say has the petioles and nerves red.

Cultivated, but in no great quantity. A larger quantity is imported from the neighbouring coast.

3. *P. siriboa.* Willden p. 161. Siriboa, Rumph 5, p. 340, t. 117, f. 2. Mal. Bakee.

The fruit is nearly as long as a finger, and tastes like the Betel leaf. It is used as a substitute for it, especially at sea, where the fresh leaves of Betel cannot be procured. (No doubt "Bakek" *Piper miniatum* Bl. is intended).

4. *P. chaba*, H.

Leaves, alternate, petioled, lance-ovate, oblique at the base, with veins opposite. Spikes: leaf-opposed, peduncled, sub-cylindric, compact. Piper Longum. Tsjabe Rumph: 5, p. 333, t. 16, f. 1. Mal. Chabatadee.

Cultivated and used as long pepper, but a very distinct species from the Malabar or Bengal long pepper.

5. *P. latifolium?* (*Piper longum* L.).

Fruit: like the former. Leaves: alternate, deeply cordate, obtuse, nine nerved. Mal. Gadoo or Gadookh. The leaves are used as a pot herb.

## TRIANDRIA—DIGYNIA.

### SACCHARUM.

1. *S. officinarum*, Sugar-cane. Mal. Toboo.

Cultivated very successfully, and yields abundance of good sugar. Manufactories of it were undertaken, but have been deserted on account of the excessive price of labour.

2. *S. cylindricum*, Willden 323. Lamarck. Encyclop. 1, p. 588, t. 40, f. 2. *S. Koenigii*, Retz. obs. fasc. 5, p. 16, N. 28. *Gramen caricosum*, Rumph. p. 6, 17, t. 7, f. 2, A.

Root: creeping, jointed at the distance of an inch. Stalks cespitose, jointed; joints bearded. Panicle spiked, cylindrical, pedicels three flowered. Malay Lalang.

This grass springs up abundantly, in rich ground, which has been cleared of the large timber, and afterwards neglected. It then becomes the greatest obstacle to the labour of the cultivator. Its habit and history are well delineated by Rumphius.

### ARUNDO.

*A. trivalvis*, H.

Calyx three valved, three or four flowered. Stalks tall (10 or 12 feet) piped, knotted. Leaves alternate, bifarious, very long and narrow; petioles vaginating, half the length of the joints, villous at the origin of the leaf. Panicle terminal, diffuse, large. Pedicels very slender, flowers minute. Calyx Glume three or four flowered; three valved, valves alternate, lanceolate, the inner one longer. Cor: Glume, two valved, valves lanceolate; concave; the outer longer, firmer, woolly at the base and along the margin. Nect. Two scales, obovate membranous, very small. Stamina and Pistillum as in the genus. Growing abundantly on the side of a hill near Soongey Clooan. (Probably *Neyraudia madagascariensis*).

## TETRANDRIA—MONOGYNIA.

### IXORA.

1. *Ixora malaica*, H. (Apparently *I. congesta* Roxb.).

Sp. Diff. Shrubby, erect; Leaves short petioled, oblong ovate, pointed, corymbs terminal; teeth of the calyx obsolete. Anthers bristle pointed.

Stam: shrubby, erect. Leaves: opposite, petioled, large, oblong ovate, pointed, most entire, smooth. Petioles: short, spreading. Flowers: in terminal corymbi; of a deep orange. Teeth of the calyx: obsolete. Divisions of the Corol: very obtuse. Anthers terminated with a bristle like point. Stigma: two lobed. Found near the waterfall, and in the sides of the hill.

2. *I. lanceolata*, H. (*I. lobbiana* Hook. ?).

Sp. Diff. Shrubby, leaves short petioled, lanceolate pointed corymbs terminal, trichotomous; teeth of the calyx and segments of the corolla pointed; anthers bristle pointed.

Stam: shrubby. Leaves: opposite, decussated, lanceolate, pointed, most entire, smooth. Petioles short, spreading. Flowers orange in corymbs terminal, trichotomous throughout, compact. Calyx teeth pointed. Corolla segments pointed. Filaments short, very slender; anthers incumbent, terminated with a bristle like point. Found on the hill half way up.

3. *I. cuneata*, H. (*I. arguta* Br.).

Sp. Diff. leaves wedge form, pointed, half stem clasping, villous below; corymbs terminal, compact; segments of the calyx and corolla acute villous.

Stam: shrubby; branchlets pubescent. Leaves opposite, decussated, sessile, almost stem clasping wedge form, pointed, most entire, rough, below villous. Flowers white, very slender, very numerous, in terminal compact corymbi. Bracts two to each flower, lance-linear, sharp, villous. Calyx villous, deeply four cleft, divisions sharp, erect. Segments of the corolla sharp, villous below. Found near the waterfall.

### CALLICARPA.

*Callicarpa dentata*, Roxb. (*C. cana* L.).

"Shrubby, downy; leaves ovate-cordate and elliptic, acutely dentate, serrate wrinkled, very downy underneath; panicles axillary. Sub-globular, dichotomous, a little longer than the petioles, calyx woolly, four toothed, stigma bifid, berries purple." *Callicarpa americana* Loureiro p. 88? Grows plentifully in the forests near the bottom of the hill.

## PENTANDRIA—MONOGYNIA.

### PLUMBAGO.

*Plumbago rosea.* Cultivated in gardens.

### IPOMEA.

*I. pes-caprae*, Convolvulus grows plentifully in sandy-soil near the sea.

### NAUCLEA.

1. *Nauclea gambeer*, H. (*Uncaria Gambir* Roxb.).

Climbing; branches round; leaves ovate, pointed, smooth; stipules two, lateral, falling; peduncels axillary, solitary, simple, jointed. Stem: shrubby; climbing to a great height, covered with a rough brown bark, branches crowded, round, smooth; branchlets opposite, widely spreading. Leaves opposite, petioled, ovate pointed, waving, widely spreading, smooth, below marked with transverse parallel veins. Stipules at the bases of the branchlets and petioles, two, lateral, parabolical, sessile, widely spreading, smooth, falling. Peduncles axillary, solitary, round, straight, horizontal, much shorter than the leaves; jointed near the apex and bracted; after the flowers have fallen the lower joint persistent, recurved, forming a hooked spine. Bracts four, ovate, acute, spreading, very small, falling.

Flower aggregate, globular; composed of very numerous florets, crowded on a globular, naked very small receptacle. Calyx perianth common, none proper one leafed, oblong, incrusting the germ, persistent, mouth five cleft, divisions lanced erect. Corolla as in the genus. Stam. Filaments five, very short; anthers oblong, capsule pedicelled, oblong, encrusted and crowned with the calyx; tapering to a point below, two celled, two valved; the valves adhering at the apex, splitting at the sides. Seeds very numerous, oblong, very small, compressed, furnished at both ends with a membranous pappus.

The flowers full spread I suppose last a very short time; for although I have frequently looked for them, I was never able to find them.

From the leaves of this shrub is prepared a substance called Gambeer, which is used by the inhabitants of the eastern coasts and islands to chew along with the leaves of Betel in the same manner as Kut (Succus japonicus of the shops), in other parts of India. The modes of preparation are two. The first is by boiling the leaves. See Marsden's Sumatra p. 243, where he quotes for a particular account of the manufacture, the second volume of the Transactions of the Batavian Society. This process was performed under my inspection by a Chinese of Prince of Wales's Island.

Seven catties (or 9⅓ lbs.) of the leaves, plucked clean from the stalks, were boiled, in a large pot, for one hour and a half, adding more water, as the first wasted, till towards the end of the process, when it was inspissated to the consistence of a very thin sirup. When taken off the fire, and allowed to cool, it became solid. It was then cut into little squares, which were dried in the sun, turning them frequently. After one month, I weighed them, and found ten ounces and two drachms, troy weight.

The Gambeer prepared according to this process is of a brown colour, but from some parts of the Malay coast, and of Sumatra, it is brought in little round cakes, almost perfectly white. According to Dr. Campbell of Bencoolen, this is made by cutting small the leaves and young twigs, and infusing them in water for some hours; when a foecula is deposited, which is inspissated by the heat of the sun; and moulded into round cakes.

The Gambeer, when first tasted, impresses on the palate a strong sensation of bitter and astringency. But it afterwards leaves a sweetish taste, which remains a long time. From these sensible qualities, it may reasonably be expected to prove useful in medicine.

A plantation of this shrub, and a manufacture for this drug, was set on foot, some years ago, by a Chinese near Batoo-Lanshun. But he found the same obstacle to this, that has proved fatal to most other manufactures hitherto attempted on the island. The pay of his workmen came so high, that the drug cost him more than the market price of that which is imported. He has therefore rooted out the plants, and put pepper vines in their place.

From the sensible qualities of the Gambeer, it appears likely to yield a considerable quantity of tanning substance, which has lately been the subject of inquiry from the Honourable the Court of Directors, respecting the Kut, or Cutch. And, some rough trials which I have made on it, with animal gluten, compared with those of Dr. Roxburgh on Kut, evince it to be richer in that material than the Kut.

Not having found the flowers expanded, I was unable to give that most essential part in my drawing; but the deficiency has been supplied by the favour of Dr. Roxburgh from a drawing transmitted to him by Dr. Berry of Madras.

2. *Nauclea acida*, H.

Climbing; branches four cornered, smooth; Leaves ovate, pointed, smooth; Stipules four, pointed; Peduncles axillary, solitary, simple, jointed, bracted, recurved after flowering, persistent.

Perhaps *N. aculeata*, Willden 929. *Uncaria aculeata.* Willden Uster, Delect. 2, p. 200. *Uncaria* Gen. Pl. ed. Schreb. n. 311. *Ourouparia guianensis* Aubl. gui. 1, p. 177, t. 68. The leaves have an acid taste. Found at Soongey Clooan.

3. *Nauclea sclerophylla*, H.

Climbing, branches four cornered, pubescent; Leaves elliptic, short pointed, rigid rough below. Stipules two, lateral, lunate, two lobed; Peduncles axillary, solitary, simple, jointed, bracted, recurved after flowering, persistent.

Stam: shrubby, climbing. Branches opposite, brachiate, four cornered, four furrowed, pubescent, spreading. Leaves: large, opposite, decussated, elliptical, short pointed, waving, rigid; above, smooth; below pubescent nerved, reticulated. petioles short, cylindrical, pubescent, spreading. Stipules two, lateral, lunate, two lobed, horizontal. Peduncles axillary, solitary, compressed, spreading, a little recurved, pubescent, twice the length of the petioles, near the apex jointed and bracted; after the seeds have fallen, more recurved, and sharp like thorns. Bracts six, lanceolate, verticelled, at the joint of the peduncle. Calyx common none Proper perianth continued above the germ, funnel form, pubescent without; five cleft, with segments lanceolate, erect. Corolla funnel shape; tube twice as long as the calyx, dilated above, villous without, segments of the limb ovate, obtuse. Stam filaments very small, in the throat of the tube; Anthers lunulate, bifid at the base, incumbent. Pist: Germ ovate, easily split into two when the calyx is removed; stigma ovate. Found on the top of the hill.

## MORINDA.

*Morinda citrifolia*, *Bancudus latifolia*, Rumph 3, p. 158, t. 99. *Coda pilava* H. M. 1, p. 97, t. 52. Tagaroo of the Circar Hindoos. Roxb. Aal in Malaya; Atchy in Oude. Hunter in As. Res. 4, p. 37. Muncooda Malay at P. of W. Island.

This tree is cultivated (as noticed before) to support the pepper vines. If the prejudice entertained by the Chinese planters, against it, should prove to be illfounded, it would be a more profitable tree than the Erythrina, because its roots furnish a valuable dyeing substance.

## MUSSOENDA.

*Mussoenda frondosa.*

Growing abundantly all over the woods, both on the hill and the plain.

## ATROPA.

1. *Atropa trichotoma,* H.

Stam: arboreous panicles terminal, trichotomous, divaricate; leaves obovate, crowded. Tree middle sized, erect. Branches verticelled, horizontal, covered with a rough muricated bark. Leaves: towards the extremities of the branches, crowded, opposite, decussated, sessile, stem clasping, obovate, large 17″ long, 14″ broad most entire; smooth; with a middle rib thick, three cornered nerves spreading parallel. Peduncles terminal, trichotomous, forming a divaricating panicle; common peduncle cylindrical, thick; lateral ones opposite, decussated, horizontal; again twice trichotomous: proper pedicels very short. Flowers large, within white, without yellowish. Calyx one leafed, five cleft; segments ovate, erect, closely embracing the base of the corrolla; when the fruit ripens, spreading, withering. Corolla one petaled, funnel shape, tube cylindrical, short, limb bellied, five cleft, segments ovate, blunt, equal, reflected. Stam: filaments five, arched, declining, awl-shape, rising from the throat of the tube, nearly as long as the corolla, anthers arrow form, versatile. Pist: Germen above, oblong, smooth, style thread form, erect, the length of the stamina, stigma headed. Per: Berry oblong, smooth, sitting on the calyx, two celled, with a receptacle fleshy, convex on both sides, kidney shape. Seeds, very numerous, small, kidney shape.

I have placed this under the genus Atropa from the structure of the fruit; but it differs by having the stamina declining and not divergent.

I do not know whether the tree is indigenous at Prince of Wales's Island. The only one I saw, grew in the area of a house, belonging to a Chinese in George Town. It is said to grow abundantly at Acheen, and to be used as a topical application to limbs afflicted with chronic pains. The whole plant has a disagreeable heavy smell, and sitting in a room with a branch of it is apt to give a headache.

2. *Atropa ? virgata*, H.

Stem shrubby, wand like; spikes terminal interrupted; Flowers sub-sessile, crowded leaves oblong. Stems several from one root, shrubby, wand like, jointed, cylindrical, smooth. Leaves opposite, oblong-oval, pointed, most entire smooth; (length one foot, breadth five inches). Spike terminal, interrupted. Flowers large, of a cream colour; sub-sessile, crowded. Calyx Perianthium small, one leafed, pitcher form, five cleft; segments ovate, obtuse connivent. Corolla one petaled, funnel shape, tube cylindric, limb bellied, five cleft, segments ovate, obtuse, nearly equal. Stam: filaments five, arched, declining; rising from the throat of the tube, longer than the corolla, anthers arrow form, versatile. Pist: Germen ovate, smooth, style, awl-form, erect, a little shorter than the stamina; stigma orbiculate, depressed. Germ: two celled, with receptacles kidney shape, rudiments of the seeds numerous.

Not having found the fruit I could not positively ascertain the genus; but have placed it here from the structure of the germ, and the similarity of the flower to that last describ-ed. It is a very handsome shrub growing in the woods.

(I cannot guess what either of these are).

## SOLANUM.

*Solanum indicum.*

Growing in vallies near to water courses, in the hills.

## IGNATIA.

*Ignatia amara ?* (*Strychnos* probably *Tieute* Bl.).

This tree I did not see, but found on the road up the hill, at the foot of some tall trees, a fruit which I take to be that of the Ignatia.

Berry globular, covered with a woody, brittle shell, with a mucous pulp. Seeds about four, oblong, convex without, angular within, very hard, covered with a thin cuticle. These seeds exactly resembled the beans of St. Ignatius, and had the same bitter taste.

## ARDISIA.

1. *Ardisia umbellata*, H.

Shrubby; Leaves obovate, most entire, smooth; umbels axillary and terminal, simple. Stem shrubby, erect. Branches scattered, stiff and straight, shorter towards the top of the stem, forming a conical head. Leaves scattered, petioled, obovate, most entire, smooth. Petioles very short, spreading, flat above. Peduncles axillary and terminal, round spreading; shorter than the leaves, umbelled. Umbel with rays about six, of the structure of the peduncle. Flowers small, purple. Calyx segments ovate, obtuse, erect. Corolla segments lance-ovate, sharp. Berry globular, smooth, black. Seed roundish, covered with a brittle striated shell.

2. *Ardisia nutans*, Roxb. (Prob. *A. crenata* Roxb.).

Leaves lanceolate, crenate. Racemes terminal. Flowers drooping. Stem shrubby. Leaves alternate, lanced, acute; obscurely crenated, smooth. Racemes terminal. Flowers many, small, of a dilute rose colour, drooping. Calyx segments, lanced, erect. Corolla segments ovate, acute. Berry roundish, smooth; scarlet colour. Seed globular, covered with a brittle striated shell (or aril)?

Is it the same with *Pyrgus racemosa* of Loureiro (p. 148)? Willdenow remarks that the generic character of that plant agrees with Bladhia, except the arilled seed. Now both this and the last species have a thin brittle aril. May not the genera Ardisia and Bladhia be united? Found in the valley, near the waterfall and on the top of the hill. Was in flower in May, and again in December.

N.B. The germ dissected contained the rudiments of eight seeds.

### TECTONA.

*Tectona grandis.*

Teak tree. A few trees cultivated in the Honourable Company's spice plantation. Brought from Java.

### MANGIFERA.

1. *Mangifera indica,* Willden p. 1150.

Leaves oblong lanceolate, (panicles terminal R.) flowers sub monandrous; drupe very large, kidney form. Willd. and Roxb. Cultivated.

2. *Mangifera foetida,* Lour. ed. Willd. p. 199.

Racemes, elongate, petals entirely reflected; drupe cordate, pubescent. Lour. Manga foetida. Rumph. 1. 1. cap. 23 tab. 28. Tree large, with divergent branches. Leaves sparse, oblong, most entire, smooth; below with parallel nerves (length eight inches, breadth two). Petioles ascending, thicker at the base (one or one and half inch in length). Panicles terminal, composed of racemes sparse, spreading: peduncles in threes, very short, again bifid, proper pedicles very small. The whole panicle red. Bracts two, scale like, very small, at the base of each pedicel. Calyx perianth five leafed; leaflets ovate, acute, concave, erect of a scarlet colour. Corolla petals five, lanceolate, acute, reflected from the base sessile; yellow at the base, rose colour in the centre, whitish at the margin and apex. Stam filaments five, awl-shape, unequal, erect, connected at the base; anthers oblong, erect. Pist: Germ globose, smooth; style thread form erect, the length of the stamina; stigma simple obtuse. Drupe heart shape; not hairy. Cultivated. Mal. Bachang, or Machang.

In some flowers one fifth part of the number is wanting in the Calyx, Corolla and Stamina. In others I found only a rudiment of the Pistillum. These are probably male flowers.

The flowers have hardly any smell; and the leaves, when bruised, exhale a faint herbaceous odour, not the resinous smell described by Rumphius. Perhaps it is the variety called Wani, by Rumphius, which he says is less foetid, the fruit longer, more pointed, and safer to eat that the foetid. I did not hear that the natives ascribe to the fruit of this any noxious quality.

Loureiro's specific difference seems insufficient; I would alter it thus; Leaves oblong; panicles terminal; Stamina five, fertile, connected at the base; drupe cordate.

### LEEA.

1. *Leea staphylea*, Roxb. Found at Soongey Clooan. (*Leea sambucina* Willd.).

### CARISSA.

*Carissa carandas.* Cultivated.

### CERBERA.

*Cerbera salutaris ?* Loureiro ed. Willd. p. 168.

Leaves oblong oval, scattered; corymbs terminal. Segments of the calyx cuneate, pointed. Stam: a tree, middle sized, branches spreading. Leaves scattered, crowded towards the ends of the branches; petiolate, oblong oval, most entire, glossy. Petioles short, wide spreading, smooth. No Stipules nor Bracts. Flowers large (but smaller than those of the Cerbera Manghas) white. Calyx, perianth five leaved, deciduous; leaflets cuneate pointed, spreading. Corolla one petaled, salver shape, contorted tube cylindrical, dilated at the throat, five furrowed, limb five parted, segments obovate, oblique, one side more gibbous, wide spreading. Five scales, lanceolate, ciliated from the clefts of the corol, horizontally converging, shutting the throat of the tube. Stam: filaments five, adnate to the tube of the corol, opposite to the furrows; below evanescent, above broader, compressed, shedding a fluid from a triangular papilla, a little below their apices, anthers cordate, furrowed, converging, covered by the scales of the corolla. Pist: Germ roundish, two furrowed. Style capillary, the length of the tube; Stigma headed, emarginate, embraced by the anthers. Drupe large (size of a goose egg) oval, slightly furrowed on one side; covered with a smooth, red pellicle; pulp hardly perceptible. Nut fibrous, woody, very porous, one celled; kernel single.

I have only seen it in gardens, or about houses. In flower all the year.

## WEBERA.

*Webera adunca*, H. (*Canthium parvifolium* Roxb.).

Spines axillary recurved; leaves ovate; peduncles axillary, one to four, one flowered.

Shrub: middle sized, branchy. Branches four cornered, furrowed, opposite, brachiate. Leaves opposite ovate, most entire, smooth, small, petioles short, below convex, above furrowed. Stipules two lateral, triangular, very small, withering. Spines axillary, solitary; short, recurved. Peduncles axillary, one to four, thread form, very short, one flowered. Bract oval, concave, two lipped, at the apex of the peduncle, embracing the base of the calyx. Flowers small, greenish yellow, nodding. Calyx perianth one leafed, bell shaped, obscurely five toothed, persistent. Corolla one petaled, funnel shape tube bellied; limb five cleft, segments lanceolate, spreading. Nect. Laciniæ numerous, linear, inserted into the throat of the corolla, hanging down within the tube. Stam: filaments five, thread form, very short, erect, arising from the throat of the corolla; anthers ovate, incumbent. Pist: Germ ovate, below; above truncate; Style awl form, villous round the base: Stigma cylindrical, five furrowed, emarginate. Berry roundish, depressed, two celled; crowned with the Calyx. Seeds: solitary, oblong. Grows in hedges, flowers in April.

## HUNTERIA, Roxb.

"Gen: Char. Contorted; Calyx five parted; Corol one petaled, infundibuliform; Berries two."

*Hunteria corymbosa*, Roxb. "Leaves opposite, elliptic, polished; Corymbs terminal Berries short, pedicel'd, two-seeded."

Stem sub-arboreous. Leaves oblong, opposite, pointed, most entire, smooth, petioles short, slender, round, smooth, spreading. Stipules none. Corymbs terminal, trichotomous, compact, pedicels proper, very short, erect. Flowers small of a greenish white. Calyx Perianth very small, pitcher form, five parted, the segments lanceolate, erect, deciduous. Corolla, one petaled, contorted, infundibuliform; tube cylindrical, erect, bellied at the base and throat, limb five cleft, segments lanceolate, erect. Nectary a glandular circle, surrounding the base of the germ. Stam: Filaments five, very short, erect, in the throat of the tube, anthers oblong, erect, within the throat. Pist: Germ ovate, compressed, furrowed, easily parted into two, style thread form, the length of the tube; stigma headed, embraced by the anthers. Berries two, obovate, smooth, sub-bilocular; on pedicels very short, opposite, horizontal. Seeds two, ovate, within flat, without convex.

Found near the Honble. Company's spice plantation. Flowers in June.

### GARDENIA.

*Gardenia florida.* Cultivated in gardens.

### NERIUM.

*Nerium sinense*, H. (*Strophanthus* sp.).

Dichotomous; leaves lance-ovate; peduncles from the splitting of the branches, bifid; two or three flowered; segments of the corolla lanceolate. Stem shrubby. Branches dichotomous, spreading. Leaves opposite, short petioled, lance-ovate, pointed, smooth. Peduncles from the splitting of the branches, bifid, two or three flowered. Flowers large, of a deep orange colour. Calyx perianth one leafed, five parted; segments lanceolate, acute, erect. Corolla one petaled, contorted, salver shape; tube bellied; five furrowed; limb five cleft; segments lanceolate, very long, spreading. Nectary a glandular circle, starred, crowning the tube; ten toothed, the alternate teeth longer and growing to the segments of the corolla. Stam: filaments five, awl-shape, very short, in the base of the tube; anthers awl-shape, without convex horny; within angular; converging; shedding the pollen from a furrow of the internal angle near the tip. Pist: Germ above, conical, two furrowed. Style clubbed, erect: stigma blunt, closely embraced by the anthers. Follicles two, cylindrical, long, nearly joining at the tip, hanging. Seeds many, oblong, pappous, imbricated.

This elegant shrub was introduced from China, and is cultivated in the Honourable Company's spice plantation. (It is apparently lost out of cultivation now here).

Loureiro's description of his Nerium divaricatum agrees well with this species; except that the branches can hardly be called divaricate. But his plant is evidently different from the *Nerium divaricatum* of Linneus; and the figure to which he refers (Burman. Zeylan. p. 163, t. 78, fig. 1.) does not at all correspond with this plant. This shrub has a great affinity to the *Nerium caudatum* of Dr. Roxburgh.

## ECHITES.

*Echites? paniculata*, H.

Shrubby; Leaves oblong, pointed; panicles axillary, decompound nectary of five glands, round the germ. It much resembles the *Echites parviflora* of Dr. Roxburgh.

Shrub middle sized. Branches round, smooth, knotted. Leaves opposite, decussated, petioled, widely spreading, oblong, pointed, most entire, above glossy, beneath smooth. Petioles short, roundish, smooth, spreading. Panicles axillary decompound, diffuse; the partial ones opposite, of four pairs with an odd one, widely spreading, composed of three or five umbels. Flowers very small, yellow. Calyx, perianthium one leafed, pitcher form, very small, five parted, segments ovate, acute, erect. Corolla one petaled, funnel shape, contorted, limb five cleft, widely spreading; segments oblong, obtuse, bent to the left, shaggy above. Nectary glands five, ovate, surrounding the germ. Stam: filaments five, thread form, very short, erect; anthers arrow-shape, ciliate, converging. Pist: Germs two, ovate, compressed internally; Style thread form; very short: Stigma headed, pointed, glutinous; embraced by the anthers.

Not having seen the fruit, the genus is still somewhat uncertain.

### PLUMERIA.

*Plumeria obtusa,* Roxb. Cultivated in gardens.

### FLEMINGIA, H.

Gen. Char. Flower one petaled, below; berry two or four celled, many seeded; Stamina erect. *Flemingia fragrans.* Yaroon Pitree. Malay.

Stem, a tree, erect, very branchy. Leaves crowded towards the ends of the branches, spreading, petioled, oblong ovate, pointed at both ends, most entire, smooth, without nerves. Petioles short, round, smooth. Stipule axillary, withering. Peduncles axillary, round, smooth, spreading, shorter than the leaves; trifid; the partial ones again twice trifid making 27 flowers in the entire corymb fastigiate. Flowers middle sized, of a whitish yellow or cream colour fragrant. Calyx, perianth one leafed, pitcher form, very small, five cleft, persistent; segments ovate, converging. Corolla one petaled, funnel form, tube short, dilated at the throat, limb five cleft, segments ovate, obtuse. Stam: filaments five, thread form, erect, longer than the corol, arising from the throat of the tube; anthers oblong small, incumbent. Pist: Germ above, ovate, very small: Style thread form, erect, the length of the Stamina; Stigma blunt. Berry small, globular, smooth; two (or four) celled. Seeds: many, shape-lees, rough.

The Berry being of a delicate texture, it is difficult to ascertain whether it has two or four cells. In the first case, it will come near Fagroea, and ought to come before Plumbago, in this Catalogue. This tree is found in a garden in the Prince of Wales's Island, but is not indigenous. Whence it came is unknown.

The flowers are very sweet scented. The fruit is bitter, and said to be poisonous. (Apparently some species of *Webera* the Jarum Jarum of the Malays).

## HEXANDRIA—MONOGYNIA.

### BROMELIA.

*Bromelia ananas.* The Pine Apple.

Cultivated, but require and receive very little attention, so that in many parts they appear to be growing wild. Ten thousand plants are reckoned to fill an Oorlong of ground, producing, in the second year one pine apple each. A variety, with the leaves variegated has been introduced from the Moluccas.

### CRINUM.

*Crinum zeylanicum.* In gardens.

### GETHYLLIS.

*Gethyllis lanceolata ?* (*Curculigo* sp.).

Leaves lanceolate, ovate, plaited. Spikes radical, ovate. vaginae or scales, lanceolate, concave, sessile. Flowers small, yellow; segments lanceolate. Cultivated in gardens. Came from China.

### DRACOENA.

*Dracoena ferrea.* (*Cordyline terminalis* var. *ferrea*).

The germen when the plant is in flower, being dissected, contains in each cell (three in number) the rudiments of several seeds. Probably only one comes to perfection. At the root of the pedicel of each flower are three small lanceolate scales, which Loureiro calls a three cleft proper Perianthium. The stem is correctly described by Loureiro, and certainly does not at all correspond with the specific character of Linneus, "*arborea.*"

### LICUALA.

*Licuala spinosa*, Willd. 2, p. 201. Thumb. nov. gen. 70. Gaeertner. fruit. 2.268. *Corypha pilearia.* Loureiro. ed. Willd. p. 265. *Corypha licuala* Lamarck. Encyclop 2, p. 231.

Calyx, perianth one leafed, cup-shape, without villous, leathery; three cleft; segments erect, obtuse. Corolla one petaled, three cornered, three cleft; segments lanceolate, erect. Nect. a ballous circle, stamen bearing, adnate to the tube of the Corolla. Stam: Filaments six, very short, erect, arising from the margin of the nectary, anthers twin. Pist: Germ above, turbinate, three lobed, style thread form erect, the length of the stamina, stigma sharp, two cleft. *Licuala arbor.* Rumph. 1. p. 44. t. 9. is said to represent it. But, in all the specimens I have seen the spadices of the fructification rise much higher than the leaves, whereas the contrary appears in the figure of Rumphius. The tree is very common on the Island.

## DIGYNIA.

### ORYZA.

*Oryza sativa*, Rice. Bras. Mal.

Of this there are, as in Cochinchina and other eastern countries, two principle varieties, one growing in low watery ground, (Gaga) and the other on the sides of the hills (Sawa). As the seeds of the one cannot be successfully cultivated in situations adapted to the other, they are probably distinct species, though their distinguishing marks have not been hitherto discovered.

## TRIGYNIA.

### FLAGELLARIA.

*Flagellaria indica*, Willd. 2, p. 263. In hedges by the road side: Flowers in July.

## OCTANDRIA—MONOGYNIA.

### OSBECKIA.

*Osbeckia tetrandra*, Roxb. (*Anplectrum glaucum* Triana).

" Shrubby, scandent; Leaves opposite, 3 nerved; panicle terminal, Flowers tetrandrous." Found near the waterfall.

### ALLOPHYLUS.

*Allophylus racemosus ?* Leaves ternate, flowers racemous. Swartz. Prod. p. 62. *Ornitrophe occidentalis ?* Willd. 2, p. 323. " Leaves ternate; leaflets subsessile, racemes simple." W. *Allophylus ornitrophioides ?* Roxb. " Leaves ternate; leaflets lanceolate, serrate, Racemes axillary, simple. Petals woolly on the whole of the inside R." Cheen chang. Malay.

Stem twining, round, shrubby; covered with a rough brown bark. Branches scattered, spreading. Leaves scattered, ternate; leaflets oblong-ovate, acute sub serrate, smooth, petioles common, long, straight, spreading, furrowed above, proper, very short, stipules none; bracts none: flowers very small, in racemes axillary simple, erect; when the fruit is ripe drooping. Peduncle, common, the length of the leaves; proper, very short, scattered. Calyx Perianth four leaved; leaflets ovate, obtuse, concave, persistent; the two outer smaller. Corolla petals four, obovate, retuse, ciliate, concave, a little smaller than the leaflets of the calyx; with wedge form claws. Nectary, glands four, reniform at the bases of the claws of the petals. Stam: filaments eight, subulate, erect, villous, at the base, the length of the calyx; anthers twin. Pist: Germ above, roundish, villous, twin; style columnar, from the fissure of the germ, erect, stigmas two, acute, reflex. Drupe small, roundish, smooth. Nut, globular, with a thin shell; kernel roundish, irregularly furrowed. Obs: One lobe of the germ is always abortive.

Found in thickets, climbing on other shrubs. (A variety of *Allophyllus cobbe* Bl. apparently, but I never saw it climbing).

### MIMUSOPS.

*Mimusops elengi.* In gardens.

### XYLOCARPUS.

*Xylocarpus granatum,* Willd. 2, p. 328. *Granatum littoreum.* Rumph. 3, p. 92, t. 61. Kayo Neeree. Mal. Found near Soongey Clooan, in thickets within reach of the tide.

### LAWSONIA.

*Lawsonia inermis.* Cultivated in gardens.

### MELICOPE.

*Melicope tetrandra,* Roxb. (*Tetractonia Roxburghii* Hook. fil.).

Stem: arboreous, straight, tall. Branches only near the top, crowded, dichotomous, covered with a rough bark. Leaves towards the extremities of the branches, crowded, opposite, decussated, petioled, obovate, most entire, smooth, below sprinkled with glandular points, petioles short, round, smooth, thick at both ends. Panicles axillary, and terminal, diffuse. Peduncles partial, nearly opposite, cross armed. Flowers minute, whitish, sweet scented. Calyx Perianth one leafed four cleft; segments triangular. Corolla petals four, ovate, acute, spreading. Nectary, a glandular circle, surrounding the germ. Stam: Filaments four, thread form, spreading, the length of the corolla, inserted between the nectary and the calyx, anthers reniform. Pist: Germ four, cleft; style thread form, erect, stigma obtuse.

I did not see the ripe fruit. Found on the hill. Flowers in May.

## ENNEANDRIA—MONOGYNIA.

### LAURUS.

1. *Laurus cinnamomum,* Willd. 2, 477.

"Folis trinervis ovato-oblongis, nervis versus apium evanescentibus." "Leaves opposite, three nerved, ovate, oblong; Panicles terminal. Nectarial glands clavate." Roxb.

Kayo-manis. Mal. The Cinnamon Tree. A few cultivated in gardens, as a curiosity or for ornament.

2. *Laurus culilaban,* Willd. 2, 478.

"Folis trinervis oppositis." *Cortex caryophylloides.* Rumph. 2, p. 65, t. 14. Coelit Lawan. E. N. C. dec. 2, ann. 3, p. 53.

The leaves of this tree greatly resemble those of the former, and the distinction above quoted from Linneus is insufficient and inaccurate. The following are the chief particulars in which they differ.

1. The trunk of the Culilaban is erect and straight, and the foliage rises in a conical form, terminating in a point. The trunk of the Cinnamon is crooked and its foliage spreads irregularly.

2. The leaf of the Culilaban is three nerved, exactly like that of the Cinnamon; that is the nerves meet in the base, or as near it as those of the Cinnamon, and like it they vanish towards the point. But this leaf is more oblong and pointed that of the Cinnamon, so as to become lanceolate.

3. Not having seen the tree in flower, I cannot say whether a mark of distinction can be taken from the situation and structure of the panicle; or from the parts of the flower. But if the fruit is truly represented by Rumphius it is very remarkable.

4. The young leaves of the Cinnamon have a yellow colour richly streaked with red. Those of the Culilaban are much paler, and of an uniform colour, without any mixture of red.

There are many young trees in the Honourable Company's spice plantation; and several in private gardens. From the bark and roots an oil is obtained by distillation in the Moluccas, which is highly esteemed as a powerful and agreeable aromatic.

## ANACARDIUM.

*Anacardium occidentale.* The Cashew nut.

Now very common, but I have not observed it in the Forests.

### CASSIA.

*Cassia alata*, Willd. 2, 523.

"Folis octo-jugis ovali oblongis exterioribus minoribus, petioles glandulatis, stipulis patulis."

The above character being quite insufficient the following is given by Dr. Roxburgh.

"Shrubby, Leaflets 10-12 pairs, linear oblong; no glands. Stipules rigid. Racemes terminal. Bracts coloured, caducous. Legumes enlarged on each side, with a broad, crenulated, membranous wing; Seeds numerous."

Glengang-gaja. Malay. Dawun Coopong, Amboin.

The leaves bruised and applied in form of epithem, are said to cure herpetic eruptions. It is used for the same purpose in the West Indies, where it has obtained among the French the name of Herbe aux Dartres. Herpetica. Rumph. 7, p. 35, t. 18.

### COESALPINIA.

1. *Coesalpinia sappan*, Willd. 2, 533.

Roxb. Corom. Pl. 1, p. 17, t. 16. *Lignum sappan* Rumph. 4, t. 21. *Tsiam pangam.* Hort. Mal. 6, p. 3, t. 2. A few plants in the Honourable Company's spice plantation.

2. *Coesalpina bonduccella*, Roxb.

*Guilandina bonduccella*, Willd. 2, 534. Globule majores Rumph. 5, p. 92, t. 49, f. 1. Found near Soongey Clooan.

3. *Coesalpinia resupinata*, Roxb.

"Arboreous, sub-scandent, armed: Leaves bipinate: pinnae 10-12 pair; Leaflets minute, 10 paired. Common petiole armed on the under side. Stipules most minute, caducous. Racemes axillary, Flowers resupine. Legume two seeded, contracted between them.

Very common everywhere by the road side. Being a strong prickly shrub, and very branchy, would make a good hedge.

### POINCIANA.

*Poinciana pulcherrima. Coesalpinia pulcherrima*, Willd. 2, p. 531. Cultivated in gardens.

### HYPERANTHERA.

*Hyperanthera moringa*, Willd. 2, p. 536. (*Moringa pterygosperma Roem*). Pretty common, planted, but I have not seen it wild.

### MURRAYA.

*Murraya exotica*, Willd. 2, p. 548. *Chalcas paniculata.* Mant. 68. *Chalcas cammuneng.* Burm. ind. 104. *Camunium. Rumph.* 5, t. 18, f. 2. *Marsana buxifolia.* Sonnerat. 2, p. 245, t. 139.

Of this there is at present on the Island, only one young tree, in the garden of Lieut. Col. Polhill. It has not yet ripened seeds. But the tree is pretty common in the neighbourhood of Queda, and the wood from the upper part of the root, which is yellow with veins of a darker colour, takes a beautiful polish. Of this the Malays make the sheaths and handles of their creeses. The flowers are very fragrant. Kayo-Kamoonin. Mal.

New Genus? To stand between *Boswellia* of Dr. Roxburgh and *Gilbertia* (Gmel. syst. nat. p. 682), or Quivisia (Jussieu p. 293). Gen. Char. Cal. 5-leafed (or 5 parted) Cor. 5-petaled. Nectary a glandular circle surrounding the germ. Filaments long. Capsule 5-celled, with half partitions down the middle of the valves, nearly subdividing the cells. Seeds two in each cell.

Stem: a tree, erect, with branches crowded. Leaves sparse, about the extremities of the branches, petioled, obovate, most entire, smooth. Petioles short, spreading, smooth; below convex, above flat. Stipules none. Peduncles axillary and terminal; dichotomous. Flowers small, a whitish yellow. Calyx perianthium five leaved; leaflets ovate, erect. Corolla petals five, roundish, erect, a little larger than the calyx. Nectary, a glandular circle, surrounding the germen. Stam:

Filaments ten, inserted on the outside of the nectary, thread form, erect, many times longer than the corolla, anthers oblong, erect. Pist: Germen roundish, smooth, style thread form erect, the length of the stamina, stigma headed. Capsule oblong, five celled, five valved, valves lanceolate, opening at the apex ; partitions double, formed by a stiff membrane turned inwards from the edge of each valve ; a half partition runs longitudinally down the middle of the inside of each valve. Seeds, two in each cell. Found on the top of the hill. Flowers in May.

### MELASTOMA.

1. *Melastoma muricata*, H. *M. decemfidum* Roxb.

Shrubby, erect ; Leaves five nerved, lance-ovate, acute, most entire, rough ; Calyx muricated, slightly ten cleft, the alternate divisions deep. Stem, shrubby, erect, round ; about seven or eight feet high. Leaves opposite, decussated, lance-ovate acute, most entire, above scabrous, below bristly, petioles short depressed, above furrowed, bristly, widely spreading. Peduncles terminal, three or four, very short, hispid, one flowered. Flowers large, purple. Calyx, bell shape, muricated, with long soft spines, the mouth ten cleft ; segments lanceolate, acute, hispid ; the alternate ones larger and firmer. Corolla petals five, wedge shape, retuse. Stam : filaments ten, thread form, erect, half the length of the corolla, inserted into the calyx, anthers long, awl-shape opening at the apex with an oblique hole ; the six alternate ones tailed, refracted, the tail long, declining, bent, bifid at the base, without scales. Pistil as in the generic characters. I did not see that fruit. Found on the hill. Flowers in May. It varies with calyx 12 cleft, six petals and twelve stamina.

2. *Melastoma malabathrica*, Willd. 2, p. 592.

Shrubby, erect ; Leaves five nerved, broad lanceolate, acute, most entire, rough ; Calyx imbricated five cleft. M. quinquenervia hirta, major, capitulis, sericeis, villosis, Burn. Zeyl. 155 t. 73. Kedali. Hort. Mal. 4, p. 87, t. 42. Fragarius niger Rumph. 4, p. 137, t. 72. Kedoodoo. Mal.

Stam: shrubby, branchy, about six feet high. Branches scattered, round, pubescent. Leaves opposite, decussated, lanceolate, most entire, scabrous, villous, five nerved; the outer nerves more slender near the margin of the leaf, petioles short, round, spreading, villous. Flowers terminal, peduncled, about four, large, purple. Peduncles very short round, erect, villous. Bracts two, at the root of each peduncle, ovate, concave, concave, covering the calyx, deciduous. Calyx perianth one leafed, bell-shaped, five cleft, imbricated with lanceolate, silky scales, of a greenish purple colour. Corolla, petals five, wedge-shape, obtuse, sessile, erect, inserted into the throat of the calyx, between its segments. Stam: as in the last species. Pist: Germ ovate, villous, in the belly of the calyx, style thread form, erect, longer than the corolla, stigma obtuse. Berry globular, five celled, wrapped up in the calyx, which converges with a five angled mouth. Seeds very numerous minute, nestling on the exterior convex surface of the pulp in each cell. Obs: when the fruit is ripe the calyx opens in a circular form round the base, and leaves the pulp uncovered.

It is a very common shrub abounding everywhere on the road side; and is one of the first that springs up on ground which has been cleared of the large timber.

3. *Melastoma osbeckioides*, H. (*Dissochaeta punctulata* Hook.).

Shrubby, scandent; Leaves five nerved, with transverse parallel streaks, cordate, ovate, acuminate, most entire, smooth; calyx smooth, obscurely four toothed, flowers octandrous; Panicles axillary and terminal.

Stam: twining, knotted, round, smooth. Leaves opposite, petioled, reclining; cordate, ovate, acuminate, most entire, smooth, five nerved, with transverse parallel streaks, petioles: short, channelled above, smooth, widely spreading. Peduncles axillary and terminal, round, smooth, forming a lax panicle: partial peduncles opposite, brachiate, spreading, generally three flowered. Flowers middle sized, whitish. Calyx pitcher-shape, obscurely four cleft, smooth. Corolla, petals four, ovate, obtuse, white with the margin reddish. Stam: Filaments eight; anthers long, subulate, refracted, incurved, with two subulate, parallel, cells, the apex opening with an oblique hole. Scales two, long, very slender, a third very short and lanceolate. Pist: Germ as in the generic character; style thread form, ascending; stigma simple.

I did not see the fruit. Found on the top of the hill. Flowers in May.

4. *Melastoma tomentosa*, H. (*Dissochaeta annulata* Hook. fil.).

Shrubby, scandent, Leaves five nerved, reticulated, cordate ovate, acuminate, most entire, tomentose below. Calyx tomentose, four cleft; flowers octandrous, panicles terminal. Stam: twining, knotted, round, tomentose. Leaves opposite, petioled, widely spreading, cordate, ovate, acuminate, most entire, tomentose below, five nerved, reticulated, petioles, short, round, tomentose, widely spreading. Peduncles for the most part terminal (a few axillary) round, tomentose; forming a diffuse panicles partial peduncles opposite, brachiate, widely spreading, generally three-flowered. Flowers, large rose colour. Calyx pitcher-shape, four cleft, tomentose. Corolla, petals four, ovate, obtuse. Stam: filaments eight. anthers as in the last species. Scales two, long, very slender; a third very short, bifid. Pist: Germ and style as in the preceding. Stigma rather sharp, gaping with a papillous mouth. Place and time of flowering the same as the last.

### AVERRHOA.

1. *Averrhoa bilimbi*, Willd. 2, p. 749.
2. *Averrhoa carambola*, Id. 2, p. 750.

Both cultivated; and the fruit used for tarts.

### RHIZOPHORA.

The essential character of this genus consists in the seed which is solitary, sub-cylindric, with only its base contained in the pericarpium. The parts of the flower admit of such diversity, both in number and form, that this genus might be divided into several, which would stand under different classes in the Linnaean system, though constituting one natural order. This subdivision may become necessary, should many new species be discovered.

*Rhizophara mangle*, Willd. 2, p. 843. *(R. conjugata* L.).

"Leaves opposite, elliptic; acute, Peduncles three flowered. Flowers octandrous; Petals four, woolly on the inside." Roxb. Jacquin. Amer: 141, t. 89, gives a very full and accurate description. He says the peduncles are two, and three cleft. The former is what I observed. Pee Candel Hort Mal. 6, t. 34. *Mangium calendarium* Rumph. 3, t. 71. Bacow. Malay.

Found in grounds overflowed by the tide. Flowers in January.

### GARCINIA.

*Garcinia Mangostana*, Willd. 2, p. 148.

There is hitherto only one tree on the Island old enough to bear fruit; but many have been planted of late. It flowers in April, and ripens its fruit in June; at which season plenty of the fruit is brought from the opposite continent, and it continues in season till August. At Malacca they have a second season in December.

### STERCULIA.

1. *Sterculia balanghas*, Willd. 2, p. 872. Phun-pho of the Chinese, who eat the seeds when toasted.
2. *Sterculia foetida*, Willd. 2, 874.

## ICOSANDRIA—MONOGYNIA.

### PSIDIUM.

*Psidium pyriferum*, Willd. 2, 957. The guava. Cultivated.

### EUGENIA.

There appear to be several species on the Island, but I have not sufficiently examined them.

### MYRTUS.

*Myrtus tomentosa*, Willd. 2, 968. *M. canescens* Lour. (*Rhodomyrtus tomentosa*). Very common everywhere by the road side.

### PUNICA.

*Punica granatum.* The Pomegranate. Booa Delema. Mal. Cultivated.

### LAGERSTROEMIA.

*Lagerstroemia reginae,* Willd. 2, p. 1178.

Roxb. Corom. 1, p. 46, t. 65. Pretty common, and grows without cultivation; but having only seen it near to present or former European habitations I cannot say whether or not it is indigenous.

## PENTAGYNIA.

### MESPILUS.

*Mespilus pomifera,* Roxb. (*Eriobotrya japonica* Lindl.).

"Arboreous; Leaves lanceolate, very acute, serrate, downy underneath: Panicle terminal. Fruit obovate, villous." Loquat of the Chinese. There are many young trees, but none far enough advanced to bear fruit.

## POLYGYNIA.

### RUBUS.

*Rubus moluccanus,* Willd. 2, 1086.

"Folijs simplicibus cordatis, sub-lobatis, caule aculeato decumbente. Thunb jap." 219. *Rubus moluccanus latifolius.* Rumph. 5, t. 47, f. 2.

Found on the top and the sides of the hill. Fruit ripe in May. (No doubt *R. glomeratus* which is frequent there is very closely allied to *R. moluccanus* Roxb.

### FRAGARIA.

A plant of this genus grows on the top of the hill, but I did not ascertain the species. The fruit is small and insipid. It is doubtless *F. malayana* of Dr. Roxburgh. (No species of strawberry is known to be indigenous to the peninsula).

## POLYANDRIA—MONOGYNIA.

### BIXA.

*Bixa orellana*, Willd. 2, p. 1154.

Several trees in the Honourable Company's spice plantation, and also in some private gardens; bearing fruit.

### GREWIA.

*Grewia paniculata*, Roxb.

"Leaves short petioled, cuneate, oblong towards the apex, serrate, downy underneath, three nerved. Stipules two cleft; Panicles terminal mealy."

This is a tree, large and very branchy. Leaves alternate, cuneate, oblong, pointed, towards the apex serrate, scabrous above, downy underneath three nerved; widely spreading. Petioles short, round, villous, thicker at the apex. Stipules lateral, erect, very small, bifid; segments lanceolate. Panicles terminal, and axillary, diffuse, drooping partial peduncles alternate, spreading; proper very short, three flowered. Bracts lateral, like the stipules, at the bases of the peduncles. Calyx common, Involucrum, three flowered, three leafed; leaflets concave, three cleft, caducous. Proper, perianthium five leafed; leaflets obovate concave, villous. Corolla, petals five, trapezoid, emarginate, one half shorter than the calyx; the base concave within, nectariferous. Stam: filaments numerous (about 50) thread form, flexuous, the length of the calyx, rising from the pedicel of the germ; anthers roundish, two lobed. Pist: Germ ovate, villous, on short columnar pedicle, style awl-shape, erect, the length of the stamina, stigma simple. Drupe small, globular. Nut three celled, top-shape, hairy.

If with Schreber and Willdenow, we make a genus Microcos distinct from Grewia, this tree will be included in the former. But the separation seems unnecessary. It is very distinct from *Grewia microcos* (Syst. Veg. 689) *Microcos paniculata* (Willd. 2, p. 1168, Burm. Zeyl. 74, H. M. 1, t. 56), which is a shrub, with lanceolate pointed leaves.

### THEA.

*Thea bogea,* Willd. 2, p. 1180. *T. Floribus hexapetalis.*

Was imported from China, and thrives remarkably well, propagating itself without any trouble, by the seeds which drop spontaneously.

### CORCHORUS.

*Corchorus capsularis,* Willd. 2, 1216.

Brought from China where it is used for hemp, as in Bengal. But the cultivation of it has not been extended.

## TETRAGYNIA.

### TETRACERA.

1. *Tetracera sarmentosa ?* Willd. 2, 1240. (*Delima Sarmentosa* L.).

"Shrubby, scandent, leaves ribbed, scabrous, serrate. Panicles terminal. Flowers monogynous. "Follicle one seeded" Roxb. Delima sarmentosa. Sp. p. 1, 736, Fl. Zeyl. 205. Amoen. Acad. 1, p. 403, Burm. ind. t. 37, f. 1. Frutex indicus sarmentosus, folis hispidis rigidis, adquamvis materiam livigandam commodissimus. Burm. Zeyl. 101. Mamplas Beteena, or Female Mamplas. Mal. It is probably the Palass of Marsden. Hist. Sumat. p. 76, who ascribes to its leaves the same use as memtioned by Burman, of polishing any substance; but Piripu. Hort. Mal. 7, p. 101, t. 54 referred to this by Willdenow, is a very different plant with leaves much longer, and soft, and with large stem clasping stipules.

Stem shrubby, scandent. Leaves scattered, oval, subserrate, rigid, scabrous: below with transverse nerves extending to the serratures; the upper surface deep green, the under paler, petioles: short, thicker at the base, furrowed above. Stipules none. Panicles terminal, diffuse. Bracts solitary, lanceolate, at the divisions of the peduncle. Flowers small, white, sweet scented. Calyx, perianthium four leafed; leaflets roundish, concave, wide spreading, the two inner ones larger, with the margin somewhat transparent. Corolla petals four, obovate, sessile, wide spreading, caducous. Stam: filaments numerous, capillary; the length of the corolla; dilated at the apex, anthers two lobed; lobes oval, distinct, laterally affixed to the apices of the filaments. Pist: Germen conical, hispid. Style subulate, incurved. Stigma obtuse. Follicle one, obliquely conical, opening at the superior suture. Seed one, its base covered with a laciniated membrane. Its roots are used by the Malay physicians as a restringent medicine in fluxes.

2. *Tetracera trigyna*, Roxb. (Doubtless *T. assa* Dec.) "Shrubby, scandent; Leaves serrulate, Panicles terminal. Flowers trigynous. Corol four-petaled. Follicles with several seeds in each." Is it *Tetracera euryandra* Willd. 2, p. 1242; Euryandra scandens. Forst. Prod. No. 228? Mamplas Jantan, or Male Mamplas. Mal.

Stem shrubby, scandent. Branches alternate, spreading. Leaves scattered, elliptic, acute, subserrate, the upper surface smooth, the under a little rough. Peduncles terminal, few flowered. Flowers middle sized, white, sweet scented. Calyx, perianth four leafed; leaflets ovate, concave, persistent; the twc outer ones thicker. Corolla petals four, cuneate, concave, spreading. Stam: As in the last species. Pist: Germs three, ovate; Styles three, awl-shape, divergent. Stigmas subulate. Capsules three, obliquely ovate, compressed, two valved, one celled, opening at the superior suture. Seeds four, ovate; the base surrounded with a long down.

This elegant climbing shrub is frequently found in hedges, by the road side. Its flowers have an agreeable perfume. It blossoms twice a year, (like most of the plants on the Island, where the sun is twice vertical) in April and October. When the fruit is ripe, the downy or silk substance, which surrounds the base of the seed, and serves as awning, is of a fine scarlet colour.

### DILLENIA.

*Dillenia secunda*, H. (*Wormia* prob. *oblonga* Wall.).

Leaves oval, acuminate, sub-serrate; racemes one sided. Stam: arboreous, erect. Leaves scattered, petioled, large, oval, acuminate, obscurely serrate, smooth. Petioles short, villous, spreading, convex below, furrowed above. Racemes terminal, few flowered, one sided; proper pedicels short, straight, a little villous. Flowers large, yellow. Calyx, perianth five leafed; leaflets roundish, concave, coriaceous, villous, without, smooth within, large, widely spreading, persistent. Corolla, petals five, obovate, twice the length of the calyx, widely spreading. Stam: filaments very numerous, club-shaped, in a double series; the outer, many, spreading, slender, shorter than the calyx; the inner fewer, erect, thicker, shorter than the former, closely surrounding the germ, anthers linear, erect, the inner twice as long as the outer. Pistil, germs eight or nine, subulate, acuminate internally connected; Styles none; Stigmas one to each germ, lanceolate, patent, forming a star. Follicles eight or nine, hatchet-shaped, straight within, convex without; at first erect; when ripe reflected, opening at the interior suture. Seeds: few, reniform, covered with a fleshy aril, connected to the interior suture of the capsule.

A native of the hills. Flowered in the Honourable Company's spice plantation.

### NELUMBIUM, Willd.

Juss. Gen. Pl. ed. Uster p. 76. Gen. Char. "Calyx four or five leafed; Cor. many petaled. "Nuts one seeded; crowned with the persistent style, immersed in a truncated receptacle."

*Nelumbium speciosum*, Willd. 2, p. 1258.

"Root creeping, Leaves peltate orbicular, entire; Peduncles and petioles murexed, flowers double rose coloured or white. "Roxb. *Nymphoea nelumbo* Linn.

Growing in tanks; the seeds esculent.

### UVARIA.

*Uvaria odoratissima*, Roxb. (*Artabotrys odoratissima*).

In the Company's spice plantation. Came from China.

### ANNONA.

*Annona squamosa*, Willd. 2, p. 1265, the custard apple.

Cultivated, the fruit plentiful and of a good quality.

## DIDYNAMIA—GYMNOSPERMIA.

### PLECTRANTHUS.

Calyx with the upper segment larger ; Corolla resupmate, ringent, the tube above gibbous or spurred.

*Plectranthus scutellarioides.* (*Coleus scutellarioides* Benth.).

Nectary gibbous, racemes terminal, three fold, verticelled. pedicles branched ; leaves ovate, serrate, downy above, veined below. *Ocimum scutellarioides* Willd. 3, p. 166. *Majorana rubra* Rumph. 5, p. 291, t. 101.

Stem : herbaceous, erect. Branches opposite, brachiate, four angled. Leaves opposite, decussated, petioled, ovate, pointed serrate ; above downy, below veined. Petioles short, declining. Stipules none. Racemes : terminal, three fold, verticelled : Peduncles opposite, two parted ; the partial ones four or five flowered. Bracts cordate, acuminate, at the bases of the peduncles. Flowers small, of a purplish blue. Calyx, perianthium bell-shape, four cleft : the upper segment larger, ovate, obtuse ; the lower two cleft, acute ; the two lateral very small obtuse. Corolla one petaled, ringent, resupinate, tube reflected gibbous above, throat drooping, limb, upper lip ascending, two cleft ; lower boat-shape declining. A gland ovate, erect, within the calyx, at the base of its lower segment. Stam : Filaments four, awl-shaped, declining, hid within the lower lip of the corolla, united at the base ; the two upper a little shorter. Pist : Germs four, ovate ; style thread form, a little longer than the stamina ; stigma slightly bifid, with segments acute. Per : none. Seeds : Four.

The branches, leaves, petioles, and peduncles are all of a brown or purple colour. Cultivated in Gardens. (The little cultivated coleus).

## ANGIOSPERMIA.

### BIGNONIA.

*Bigonia? laciniata*, H. (*Stereospermum fimbriatum* Dec.).

Leaves pinnate with an odd one, leaflets ovate, acuminate, most, entire villous; calyx one leafed five toothed; corolla funnel-shaped, five cleft, laciniated. *Lignum equinum* Rump. L. 4, c. 40, t. 46?

This is a tall tree, with a rough, ash-coloured bark. Branches towards the top of the trunk, numerous ascending. Leaves towards the extremities of the branches, crowded, opposite, decussated, pinnated, four pairs with an odd one; leaflets ovate, acuminate, obliquely sub-cordate, most entire, villous, petioles common, swelled at the base, half-round, furrowed above, villous, spreading; proper very slender, very short, spreading. Panicles terminal, divaricate; common peduncle columnar, knotted, villous; partial brachiate, horizontal, dichotomous. Flowers large, white, with purple streaks. Calyx one leafed, cylindrical, five toothed; toothlets lanceolate, erect. Corolla monopetalous, funnel-shape, tube cylindrical, a little longer than the calyx, throat large, dilated, below flat, a little bent; without villous; limb spreading, five cleft, nearly equal, segments obtuse, laciniated. Stam: filaments four, arising from the tube of the corol, approaching by their apices in pairs archwise, the two outer longer: in the middle a very short rudiment of a fifth stamen, anthers oblong, twin; lobes widely spreading, touching by their upper surface those of the opposite anthers. Pist: germ oblong, sitting on a glandular ring. Style thread form, the length of the larger stamina. Stigma spathulate.

Not having seen the fruit I cannot certainly ascertain the genus. It flowers in January, at which time the ground about the tree is richly strewed over with its beautiful flowers.

### GMELINA.

*Gmelina integrifolia*, H. (*G. asiatica* L.).

Leaves most entire; Raceme simple terminal. Stam: a large shrub, very branchy, with spines awl-shape, acute, horizontal. Branches spreading, flexile, with spines, opposite decussated. Leaves opposite, decussated, petioled, ovate, obtuse, most entire; above roughish, deep green, below downy. Petioles half the length of the leaves, slender, downy. Racemes simple, terminal, few flowered. Flowers large, yellow; structure as in the generic character. Drupe roundish, smooth, of a greenish yellow. Nut obovate, smooth three celled: one cell barren. Kernels in the fertile cells solitary, obovate, without convex, within flat.

This shrub, which approaches in size to a small tree, is very common in hedges, by the road side.

The fruit contains a juice of a disagreeable smell, and gives a very permanent stain, of a yellowish brown colour.

### PREMNA.

*Premna cordifolia*, Roxb.

"Shrubby; Leaves cordate and cordate ovate, entire, smooth, upper surface bullate and shining. Corymbs terminal, decussated with ramifications dichotomous."

The leaves have a very acrid taste. Pretty common among the underwood, in places which have been cleared of the great timber.

### VOLKAMERIA. (*Clerodendron*).

1. *Volkameria inermis*, Willd. 3, 383. (*Cl. inerme*).

In gardens. I do not know whether or not it is indigenous.

2. *Volkameria fastigiata*, H.

Unarmed; Leaves ovate, unequally serrate. Corymbs terminal, trichotomous, suffastigiate. Stem herbaceous; or perhaps somewhat shrubby. Leaves opposite, decussated, petioled, ovate, unequally serrate, wrinkled; above smooth, below slightly downy. Petioles short, slender, furrowed above, widely spreading. Corymbs terminal, trichotomous; peduncles brachiate, three cleft pedicels short, slender. Flowers large, white, sweet scented. Calyx five cleft, segments lanceolate, erect; when the fruit ripens reflected. Corolla tube long, straight; limb five cleft segments obtuse, inclining to one side. Stamens. Filaments thread form, the length of the corol, white; anthers small, deep yellow. Berry roundish, smooth.

The plant was brought from Amboyna, and flowered before it was removed from the box in which it came.

### ACANTHUS.

*Acanthus ilicifolius,* Willd. 3, p. 398.

Growing by the sides of water-courses, and in low lands near the sea from which the mangroves (Rhizophora) have been cleared away.

### THUNBERGIA.

*Thunbergia fragrans,* Willd. 3, p. 388. Roxb. Cor. 1, p. 47, t. 67. Pretty common by the road side.

## MONADELPHIA—DODECANDRIA.

### PTEROSPERMUM.

Gen. Pl. ed. Schreb. n. 1124. Willd. 3, p. 728, *Pterospermum ? parvifolium* H. (Probably *Pt. jackianum Rumph*).

Leaves alternate, lance-ovate, pointed, repand, smooth above, hoary beneath. Flowers axillary, solitary, subsessile.

Grows among the underwood, near the Honourable Company's spice plantation. Not having seen the fruit, the genus is still doubtful. Flowers in May.

## POLYANDRIA.

### BOMBAX.

*Bombax pentandrum,* Willd. 3, 731. (*Eriodendron anfractuosum*).

Pretty common, planted about houses in George Town.

### URENA.

*Urena lobata*, Willd. 3, p. 800.

Pretty common among underwood, on the plain, and also on the top of the hill. Flowers in May.

### GORDONIA.

*Gordonia spectabilis*, H. (No doubt *Schima noronhae* Burm.)

Arboreous; Leaves oblong ovate, pointed, subserrate, smooth; Flowers short, peduncled, Style one. Stem: arboreous, straight; branches ascending. Leaves, scattered, oblong-ovate, pointed, subserrate, above glossy, beneath smooth. Petioles short, slender, half round, reclining. Peduncles axillary, short, clubbed, solitary, one flowered, spreading. Bracts two, scale form, small, opposite, caducous, a little below the middle of the peduncle. Calyx perianth five leafed, leaflets roundish, concave, smooth. Cor: Monopetalous, wheeled, tube very short, limb five parted; segments ovate, concave, widely spreading. Stamens filaments numerous (about 75) awl-shape erect, arising from the tube; shorter than the corol, anthers roundish, twin. Pistil germ roundish, depressed, villous; Style columnar, four cornered, thicker above; Stigma flat, five angled. Capsule round, depressed, smooth, five celled, splitting at the top. Seeds two, in each cell, flat.

## DIADELPHIA—DECANDRIA.

### ABRUS.

*Abrus precatorius.* Growing among underwood on the plain.

### PTEROCARPUS.

*Pterocarpus draco.* (*Pt. indicus*) Lingoum Rumph. 2, p. 205. t. 70. Suna. Mal.

Stem arboreous, columnar, very branchy. Branches round, drooping, with a scabrous bark. Leaves alternate, numerous, spreading, pinnated, four pairs with an odd one;

leaflets alternate, ovate, bluntly pointed, most entire, smooth. Petiole common, round, smooth, with a thick glandular base, proper, short, very slender. Racemes axillary, compound, Peduncles common, drooping, proper slender, the length of the flowers, spreading, scattered. Flowers small, yellow, sweet scented. Calyx perianth, one leafed, bell-shape; the mouth five toothed, the two upper toothlets larger, obtuse, the three lower sharp. Corolla papilionaceous, banner roundish, clawed, reflected; claw wedge form, extending to the centre of the banner. Wings hatchet form; arth claws thread form, the length of the banner, above with are versed tooth. Keel almost two petaled, a little shorter than the wings, with claws thread form, remote. Stam: filaments, at the base united into a cylinder, split on the upper side; a little higher, divided into two bodies, equal, lateral; which at half their length, are split, each into five awl-shape ascending, the length, of the keel. Anthers roundish. Pistil germ-oblong, sharp at both ends, short pedicelled, villous. Style awl-shape, ascending, the length of the stamina, stigma simple. Legume roundish, compressed, leaf like, not opening: a lanceolate tooth on the upper margin. Seed: one, flat. Obs. The Germ dissected contains the rudiments of four seeds.

This tree, being very branchy, and thickly covered with foliage, is very much planted about houses, and used to form avenues. It flowers in April and May, and the flowers are used to give an agreeable scent to the cocoa-nut oil, which the natives apply to their hair. The tree is very vivacious; large branches lopped off any way and put into the ground, shoot out roots and branches, their growth being quick, and an avenue is thus speedily formed.

### ERYTHRINA.

*Erythrina corallodendrum.*

Used, as before mentioned, to prop the pepper vines.

### CROTALARIA.

*Crotalaria laburnifolia*, Burm. Zeyl. 82, t. 35. In gardens; came from China.

### ARACHIS.

*Arachis hypogoea.* Cachang goring. Mal. Cultivated by the Malays and Chinese, principally in their plantations of Betel nut and Cocoa nut trees, while young.

### DOLICHOS.

*Dolichos sinensis.* Cultivated for the table.

### CLITORIA.

*Clitoria ternatea.*

In gardens pretty common; but I have not seen it wild.

### CYSTISUS.

*Cystisus cajan.*

A few plants in the neighbourhood of houses; but no regular cultivation.

### ROBINIA.

*Robinia megasperma*, H. (Probably *Millettia atropurpurea*).

Arboreous; leaves unequally pinnated; five pairs; racemes terminal, compound, pedicels one flowered, crowded; legume one seeded.

Stem arboreous, large, erect. Branches towards the top of the stem, crowded. Leaves scattered, crowded at the extremities of the branches, pinnated, five pairs with an odd one; leaflets lance-ovate, most entire, smooth. Petioles common, round, rigid, thicker at the base; proper, short, widely spreading. Racemes terminal, compound; partial scattered, widely spreading; proper peduncles very short, reflex, crowded, one flowered. Flowers middle sized, purple. Calyx perianth pitcher-shape; mouth oblique, the two lateral teeth obliterated, the lower longer and more pointed. Corolla papilionaceous. Banner cordate ovate, concave; when the flower is fully spread, emarginate, reflected; claw flat, incurved, the length of the calyx. Wings oblong, converging, declining, a little shorter than the banner, with a very small obtuse appendix. Keel, boat-shape, the length of the wings, with two distinct claws. Nectary a glandular, cylindrical socket, within the sheath of the stamina, surrounding the pedicel of the germ, with mouth oblique, obscurely five-toothed, the upper toothlets longer. Stamens filaments diadelphous (simple and nine cleft) with apices ascending, the length of the keel. Anthers oblong erect. Pistil germ pedicelled, acinaciform, villous; Style subulate, ascending, a little longer than the Stamina; Stigma acute. Legume large, subovate, sharp at both ends; the upper suture gibbous; compressed smooth. Seed, one, ovate, very large.

### HEDYSARUM.

*Hedysarum purpureum*, Roxb. (*Desmodium polycarpum*).

" Shrubby, lower branches diffuse, and longer than the upright stem. Leaves threed; leaflets oval, entire; Stipules daggered. Racemes terminal, before expansion strobiliform. Legumes six-seeded, notched on the under side."

### INDIGOFERA.

*Indigofera tinctoria.*

Experiments have been made on the cultivation and manufacture of this dye. It is said to have thriven remarkably and yielded abundance of faecula, of a good quality. But the attempt was laid aside on account of the high price of labour.

## POLYADELPHIA—DECANDRIA.

### THEOBROMA.

1. *Theobroma cacao.*

A few plants in the Honourable Company's spice plantation.

2. *T. guazuma.* Several, in the same place.

## ICOSANDRIA.

### CITRUS.

1. *Citrus aurantium.*

Several orchards, particularly at Soongey Clooan, where they seem to answer better than in other parts. A small one, containing about two Oorlongs of ground, was let last year, for eight hundred dollars. Fruit in October.

2. *Citrus decumana.*

Is also in considerable quantity, but not equal to the fruit in Bengal.

3. *Citrus medica,* va. 8. Mill. Dict.

The Lime. In tolerable plenty.

## POLYANDRIA.

### MELALEUCA.

1. *Melaleuca leucadendron.* Kayo-pottee, Mal.

Several trees in the Honourable Company's spice plantation, and in private gardens. Imported from the Moluccas. Has borne flowers and seed.

2. *Melaleuca, an viridiflora ?* Linn. Trans. 3, p. 275, Gaertn. Sem. v. 1, 173, t. 35. *M. Leucadendron* B. Linn. Suppl. 342.

"M. folijs alternis elliptico lanceolatis, coriaceis, quinquenervijs, ramulis petiolisque pubescentibus." Smith. In my plant the branchlets and petioles are smooth ; it may be thus distinguished.

Leaves sparse, elliptic, lanceolate, rigid, five nerved ; spike terminal, elongate ; flowers sessile. Stem a tree, of middle size with a scabrous bark. Branches erect, round, flexible. Leaves towards the extremities of the branches, scattered, widely spreading, elliptic, lanceolate, sharp at both ends, thickish, rigid, five nerved, smooth, on both sides. Petioles very short, round, smooth. Spikes terminal, subcylindric, interrupted. Flowers small, whitish, sessile, scattered, covering by threes. Calyx perianth pitcher form, villous, adnate to the germ, five toothed, with toothlets obtuse, erect. Corolla petals five, ovate, concave, sessile, inserted into the calyx, between the teeth. Stam filaments numerous (40) thread form, united into five bundles (each containing from seven to nine) much longer than the corol; erect. Anthers reniform, above furrowed, incumbent. Pistil germ turbinate, growing to the bottom of the calyx. Style thread form, erect, length of the stamina, stigma simple. Pericarp and seeds as in the generic character. Growing by the road side, near a ditch which is never quite dry. The leaves, when rubbed, have a strong aromatic or resinous smell, approaching pretty near to that of *M. leucadendron.* (No doubt *M. leucadendron* var. *minor*).

### HYPERICON.

*Hypericon ? excelsum*, H. (Doubtless *Archytea vahlii*).

Arboreous; flowers axillary, solitary, monogynous; leaves lance-ovate, alternate. It approaches near to *H. alternifolium* (Vahl. Symb. 2, 85, t. 42). Only differing in the monogynous flowers.

Stem arboreous, tall, straight; covered with a rough, ash coloured bark. Branches near the top ascending; branchlets alternate, spreading. Leaves alternate, lance-ovate, pointed, rigid, most entire, smooth. Petioles short, furrowed, above, spreading. Peduncles axillary, solitary, one flowered, clubbed, short drooping. Bracts two, very small, caducous, at the apex of the peduncle. Flowers white, about an inch in diameter. Calyx perianth, one leafed, five parted; segments ovate, obtuse, concave, coriaceous; the two outer ones smaller. Corolla petals five, ovate, obtuse, concave, spreading; smooth, sessile. Stamens filaments numerous (45) thread form, erect, very short; united into five bundles, which join at the base into one circle; Anthers oblong, four angled, pointed, erect villous. Pistil germ above, ovate, villous; Style erect, subulate, longer than the Stamina; Stigma simple. Berry? (or perhaps a capsule, as I did not see it ripe) ovate, two and three celled. Seeds;

about four, in each cell, ovate, compressed. Obs: The germ is three celled, with free receptacles and many seeds. The stigma when magnified appears triangular, with three very small pores. After the flower has fallen, the style remains, and grows to double its original length or more.

The stamina are nearly monadelphous, the Calyx might perhaps be considered as five leaved. These circumstances, together with the monogynous flowers, berry or capsule with few seeds and alternate leaves, make me doubtful whether it can properly be considered as a Hypericon.

Grows on the sides of a valley, near the top of the hill. Flowers in May and January.

### DURIO.

*Durio zibethinus.* The Doorian.

Only a few trees on the Island, but plenty of the fruit, of which the Malays are very fond, comes from the opposite shore.

## SYNGENESIA—POLYGAMIA AEQUALIS.

### CACALIA.

*Cacalia bicolor,* Roxb.

"Shrubby, ramous; Inferior leaves petioled lanceolate, remotely serrate; superior subsagittate, stem clasping, sublanciniate. Flowers terminal, peduncles with sub-lanceolate scales; calyx calycled."

Cultivated in gardens for the beauty and singularity of its leaves, which, are deep green on the upper surface, and a fine purple on the under. It grows very well on the top of the hill.

## POLYGAMIA—SUPERFLUA.

### CONYZA.

1. *Conyza balsamifera,* (*Blumea balsamifera*), Linn. Syst. Nat. ed. Gmel. 2, p. 1220. Suppl. 1208. Rumph. 6, t. 24, f. 1.

Boonga Chappa, Malay. "Leaves lanceolate, tomentose below; petioles also toothed.

Stem shrubby, six or seven feet in height. Branches round, striated, pithy, downy. Leaves scattered, ovate lanced, unequally serrated; above rough, below tomentose, spreading. Petioles very short, tomentose, furnished with one or two teeth on each side. Stipules none. Panicles axillary and terminal, diffuse; peduncle common, rigid, erect, from two to four cleft; partial like the common. Bracts at the divisions of the peduncles, solitary, lanceolate. Flowers pedicelled, cylindric, yellow. Calyx perianth common, imbricated, cylindrical; with scales lanceolate, erect; proper none. Corolla compound, tubular. Corollets, hermaphrodite, numerous, tubular, in the disc; female numerous, similar, in the circumference. Proper, of the hermaphrodites funnel-shape, the limb five cleft, patulous, segments lanceolate: of the females tube thread form more slender, limb three cleft. Stamens of the hermaphrodites, filaments five, capillary, from the middle of the tube, anthers united into a cylinder, longer than the corol. In the female none. Pistil germ oblong. Style thread form; Stigmas two, simple; in the hermaphrodites hid within the cylinder of anthers; in the female projecting beyond the limb of the corol, spreading. Pericarp: none. Seeds: oblong, striated; pappus hairy. Recept: naked, flat.

The leaves possess the exact taste and smell of the common officinal sage, and are used in the same manner for culinary purposes. The Malay physicians give an infusion of them in boiling water as a stomachic and carminative. Loureiro and Rumphius speak highly of its virtues.

It was given in a dropsical affection which broke out among the Polygars confined in irons on the Island.* This disease resembled that which attacked His Majesty's 80th Regiment at Trincomalay, and the Lascars on board of several ships on their voyage from England. In the present instance it proceeded from despondency, want of exercise and a damp situation. The patients had the infusion to drink, and the leaves, in substance, were mixed with their food. They found it grateful to the stomach, and it seemed to contribute to their cure; although being necessarily combined with other medicines, its proportional share of merit could not be well ascertained. The progress of the disease was arrested by removing the people to a drier situation, where they could enjoy the benefit of exercise, within certain limits. This however affords a presumption that the *Conyza balsamifera* might be found an useful addition to the sea provisions of Lascars and as it grows abundantly all over the uncultivated tracts, it could be supplied in almost any quantity.

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*(Was this Beri-beri)?

2. *Conyza odorata*, Linn. S. N. ed. Gmel. 2, 1221.

Eupatoria conyzoides maderaspatana, folijs glabris, flore purpurascente. Pluk. alm. 141, t. 177, f. 2. Loureiro. Fl. Cochinch. ed. Willd. p. 605.

Grows plentifully in low ground near the sea; flowers in September. The whole plant has a strong aromatic smell, which is perceptible at some distance.

### ERIGERON.

*Erigeron conyzoide*, H. (Prob. *Crepis japonica* Benth).

Leaves ovate: lanceolate, pointed, repand, smooth; panicles terminal, umbelled; rays of the corol capillary. Stem herbaceous (or suffruticose) pithy, round, streaked. Leaves alternate, ovate lanceolate, pointed, repand, smooth. Petioles short, slender. Panicles terminal, diffuse; composed of many umbels; proper pedicels very slender. Flowers small, whitish. Calyx imbricated, with scales lanceolate, very small. Corolla compound, cylindrical, hardly radiate, corollets hermaphrodite tubular in the disc; females semiligulate in the ray. Proper of the hermaphrodite funnel form, limb five cleft. Of the female, tubular for two thirds of its length, tube capillary, very slender, limb two lipped; upper lip most minute, lower linear, revolute. Stam: In the hermaphrodites, filaments five, capillary, very short, anthers united into a cylindrical tube. Pist: as in the generic character; but the pappus is longer than the corolla in all the florets, female as well as hermaphrodite.

The rest as in the generic character. Found on the hill. Flowers in January.

## MONOECIA—MONANDRIA.

### NIPA, Gen. Pl. Schr. N: 1698.

*Nipa fruticans*, Gmel. 2, p. 12. Rumph. 1, 72, t. 16.

Each spath of male flowers, which grows alternately on strong semi-cylindrical peduncles, contains from six to twelve partial ones. Every one of these contains a simple amentum, covered with sessile male florets, closely compacted together. The petals are as described by Schreber ; but filament hardly any. Anther columnar, twelve furrowed, the length of the petals. Female flowers, only one spath, terminating the branch. Florets as described by Thunberg and Schreber. Drupes aggregate, forming nearly a globular head. The horizontal section of each drupe is nearly oval, with two projecting angles at the two ends of the longer axis, twelve longitudinal furrows on the surface. The pulp, fibrous, woody, porous. Nut shell thin, moderately hard. Seed or kernel, resembles the cocoanut in substance, is nearly tasteless, and would probably furnish plenty of oil.

The leaves, called Atup, are used for thatching.

### CASUARINA, Schreb. N. 1395.

*Casuarina equisetifolia*, Gmel. 2, p. 13. *Casuarina littorea.* Rumph. 3, t. 57.

A good many trees, close to the sea, near Poolo Ticoos. (No doubt indigenous, as early as this, but the wild plants seem to have quite disappeared now).

### ARTOCARPUS.

1. *Artocarpus incisa*, Gmel. 2, p. 14. B. fructu seminifero. Sonner. New Guin. t. 57-60.

Some pretty large trees about houses in George Town. I do not know whence they came.

2. *A. integrifolia*, Gmel. 2, p. 14.

Of this there are two permanent varieties, which Loureiro considers as distinct species.

A. Leaves obovate, below simply veined, petioles and middle rib smooth.

*Jaccus arboreus major:* Nanka. Rump. 1, t. 30. *Polyphema jaca*, Lour. ed. Willd. p. 667. Nanka, Malay. Jack of the English.

B. Leaves oblong, below reticulated, petioles and middle rib hairy.

*Jaccus arboreus minor:* Tsjampadaha. Rumph. 1. t. 31. *Polyphema champeden.* Lour. p. 668. Chimpada, Malay.

3. *A. muricata*, H. *(A rigida* Bl.).

Leaves oblong-ovate; fruit terminal, globose, muricated with sharp prickles.

Stem: arboreous, middle sized, very branchy. Leaves: oblong ovate, somewhat acute, most entire, smooth, sparse. Peticles: short. Peduncles: short, subterminal, solitary. Peduncles: short, subterminal, solitary. Fruit: compound, globular, muricated with awl-shape, rigid, brittle spines; something larger than a man's fist. Seeds: oval, each surrounded with its pulp.

The tree grows in the woods without cultivation. The fruit is ripe in July, and is brought to market by the Malays. The pulp surrounding the seeds, which is the eatable part, is yellow, of a very pleasant subacid taste.

I have heard three names given to it, Doomur, Doorian Ootang, and Booa Cleydang, but am not sure that any of these is the genuine Malay term (Curtis quotes this as only cultivated now in Penang).

4. *A. reticulata*, H. (Prob. *A. lanceaefolia*).

Fruit globose, reticulated with very small hexagonal prisms. This fruit is I am informed also terminal; but I did not see it growing. In size, shape, and internal structure it resembles the former; but its surface is composed of small hexagonal prisms, instead of sharp spines. Its time of ripening and the qualities of its pulp are the same as in the former.

I did not see the flowers of either species, so that the genus is yet uncertain, being only determined by the structure of the fruit.

### GNETUM.

*Gnetum*, Linn. gen. Schreb. 1473.

Gen. Char, Flowers amentaceous, males below in three rows, females above in a single row. Corols none. Males calyx bell-shape, woolly at the base; Stamen one, anthers two lobed. Females calyx shut, becoming a berry sitting on a lacerated scale; Stigmas four, drupe one seeded. Jussieu. ed. Ust. p. 445. Genera urticis affinia.

*Gnetum gnemon*, Fig. No. 17. Linn. S. ed. Gmel. p. 1003, Syst. Pl. Reich. IV. p. 197. Gnemon domestica. Rumph. 1 p. 181. t. 72.

Stem: arboreous, erect. Branches: opposite, brachiate, horizontal, towards the top of the stem shorter, forming a conical head. Branchlets kneed, broader below the knots. Leaves opposite, oblong oval, pointed, most entire, above glossy, below smooth. Petioles short, convex below, flat above smooth, spreading. Stipules none. Peduncles axillary, solitary three cleft. Bracts two, lanceolate, very short, stem clasping, below the division of the peduncle. Aments three, thread form, drooping; composed of verticels remote, callous, thickened. Calyx partial of each verticel peltate, orbicular, most entire; containing sesile flowers, very minute; the males below in a triple row; the females above, in one row. Of the males: Calyx proper perianth one leafed, bell-shape with mouth almost entire, surrounded with down at the base. Corolla none. Stam, filament one, clubbed, erect, twice as long as the calyx, emarginate; anthers twin, with cells disjoined; each cell two valved, splitting at the tip. Of the females: Calyx, Proper perianth one leafed, ventricose, converging closely at the point, clothing the germ, persistent; surrounded at the base with a lacerated downy scale. Corolla none. Pist: germ ovate, covered by the calyx;

Style conical, very short; Stigmas four, acute. Drupe oblong, smooth, formed of the shut calyx. Seed: nut ovate, one celled; with shell thin, brittle, ten streaked. Kernel oval, smooth.

This tree was brought from Amboyna and is cultivated in some gardens. From the luxuriancy of its foliage, and the regular disposition of its branches, it is very ornamental. The pulp of the fruit, which is the persistent calyx, is of an orange colour, and of a sweetish taste, with a mixture of astringency. Rumphius says they are unfit to be eaten raw, as they cause an itching in the mouth. The young leaves boiled are eaten as spinach. The bark of the larger branches, prepared by bruising, is spun into threads at Amboina for fishing nets and other purposes.

In some specimens, the lateral aments have only male flowers; and I have never seen fruit borne on more than one ament, which I conceive to have been in the middle.

## TRIANDRIA.

### ZEA.

*Zea mays.* Cultivated, but sparingly.

### PHYLLANTHUS.

1. *Phyllanthus cheramela,* Roxb. Cicca disticha. Gmel. 2, 287. Reich. 4, 125. *Averrhoa acida.* Syst. Nat. XII 3, p. 315.

"P. arboreous, leaflets ovate; racemes nodding, calyxes four leaved. Drupe, with nut four celled" Roxb. Cultivated in gardens.

2. *Phyllanthus agynus,* H. (*Breynia coronata*).

Shrubby, Leaves simple, alternate, bifarious; Peduncles axillary, one flowered; lower one, two or three together, male; upper solitary female; Calyxes six toothed; nectaries wanting; no Style, Stigmas three converging; Berries six seeded.

Stem: shrubby, very branchy. Branchlets: alternate, straight, round, spreading. Leaves: alternate, horizontal, petioled, ovate, acute, most entire, smooth, hoary below. Petioles: very short, very slender. Flowers: monoicous, very small, the males yellow, the females green. Peduncles: axillary, very short, very slender, drooping the lower, one, two or three together, bearing male flowers; the upper, solitary bearing females. In the Male flowers, Calyx Perianth one leafed turbinate, fleshy, pubescent without; six toothed obtuse, converging. Corolla none. Nectary none. Stam: Filament one, columnar: Anthers four, oblong, adhering lengthways to the filament below its point. In the Females. Cal: as in male. Cor: none. Nectary none. Pist: Germ pear-shaped, the size of the calyx, perforated at the top. Style none, stigmas three, awl-shaped, minute, rising from the edges of the perforation, converging. Capsule very small, globular, smooth, scarlet with yellow streaks, six valved, one celled. Seeds six, without convex, within angled, smooth.

Grows everywhere among the underwood.

## PENTANDRIA.

### NEPHELIUM, Schreb. No. 1425.

*Nephelium lappaceum*, Gmel. 2, 464. Rambootan. Mal. i. e. hairy.

This is a pleasantly subacid fruit, the pulp which covers the seed resembles that in the Leechee, and is the edible part. The fruit is of a fine crimson colour, covered with long subulate, soft bristles, whence the Malay name.

The flowers I examined appeared to be all hermaphrodite; so that a farther examination and revision of the generic character may be required.

## HEXANDRIA.

### COCOS, Schreb. No. 1692.

*Cocos nucifera*, Gmel. 2, 569. The Cocoa-nut. Malay, Clapa.

Several plantations have been formed on the Island, both on the inland plains, and on those near the sea, which have been cleared of mangroves and from the saltness of the soil are unfit for pepper. In the first of these situations, the trees are usually planted at the distance of four fathoms, or one hundred in an Oorlong; in the latter five fathoms, or sixty four. The price of planting by contract, which is the usual mode, is 350 dollars per thousand, for which they are to be taken care of for three years, or till the stems are, according to the Malay term, of the circumference of an elephant's head. The plants are furnished by the proprietor.

The trees are reckoned to produce 100 nuts each, and the net value of the crop, after deducting one third for charges of management &c., is estimated at one Spanish dollar each tree.

### Areca, Schreb. 1696.

*Areca catechu*, Gmel. 2, 649. Roxb. Corom. 1, No. 75. Pinang. Mal.

Of this extensive plantations have been formed. It thrives well in all situations, on the sides of hills nearly as much as on the plain; and the cultivation of it is attended with little trouble. They are planted at the distance of six feet, or 1600 in an Oorlong. The price by contract is 350 dollars for 10,000, the contractor taking care of them for three years, in which time the trees are three cubits high. The net produce of 1,000 trees, deducting as before, is estimated at 132 dollars yearly. In seven years they are reckoned to be in full bearing.

## MONADELPHIA.

### Ricinus, Schreb. 1464.

*Ricinus communis*, Gmel. 2, 1074. I have only seen a few plants in gardens.

### Aleurites, Schreb. 1472.

*Aleurites triloba*, Gmel. 2, 1035. Forst. Char. gen. p. 56, t. 56, Goertn. cent. 8, t. 125, f. 2. Camirium Rumph. 2,

P. 180, t. 58. Juglans camirium. Lour. ed. Willd. p. 702. Booa cras Mal. Marsd. Sum. p. 83.

Leaves scattered, cordate, sometimes three lobed, acuminate, the upper surface when young covered with a mealy dust, when older smooth ; having at the base two very small, round glands. Petioles a little shorter than the leaves. Panicles terminal, lax ; peduncles scattered, dichotomous. Flowers small, white ; females solitary, almost sessile at the bifurications of the panicle ; males on each side two or three on foliform pedicels.

Male. Calyx three cleft ; Cor : Petals five, oblong ; Stam. 18-21 united into a column. Anthers with two distinct cells, laterally growing to the filaments. Female, as described by Schreber. From the seeds is expressed a mild oil, equal to that of the olive or almond.

## DIOECIA—MONANDRIA.

### Myristica, Schreb. 1562.

1. *Myristica aromatica,* Swartz. prod. 96. *Myristica moschata.* Gmel. 2, 11. *Nux myristica.* Rump. 2, 14, t. 4. Muscadier. Sonn. New Guin. t. 116-118. The Nutmeg Tree. Pala, Mal.

Besides the extensive plantation belonging to the Honourable Company, several thousand trees are now on the estates of individuals, both European and Chinese. One nut was produced last year on Mr. Caunter's ground, by a tree, which including its growth before transplantation may be about ten years old. Though plucked before it was ripe, it had the true aroma of the best kind.

2. *Myristica oblonga ?*

The fruit is more oblong than either the *M. dactyloides* or *iryaghoedi* of Gaertner. t. 41, f. 2, and 4, but I did not examine the other parts sufficiently to establish a specific difference. Two trees grow near the Honourable Company's spice plantation. The fruit is ripe in June.

### PANDANUS, Schreb. 1485.

*Pandanus odoratissima*, Gmel. 2, 12. Rumph. 4, t. 74-81 Makwhang, Mal. Planted for hedges.

## PENTANDRIA.

### CANARIUM, Schreb. 1516.

*Canarium commune*, Gmel. 2, 405. Rumph. 2, t. 47.

A considerable number of young trees, imported from the Moluccas are in the Honourable Company's, as well as in private plantations.

### CANNABIS, Schreb. 1522.

*Cannabis sativa*, Gmel. 2, 457. Hemp.

Cultivated, as in Hindoostan, for the intoxicating quality of the leaves.

## DECANDEIA.

### CARICA, Schreb. 1536.

*Carica papaya*, Gmel. 2, p. 701.

Cultivated. It is not uncommon to see a few fruit on the male tree ; but they are not eatable.

## POLYANDRIA.

### SURUGADA, Roxb.

Gen. Char. " Male, calyx five leaved, corol three petaled Styles three ; Capsule tricoccous."

*Surugada glabra*, Roxb. (*Gelonium multiflorum*).

Found near the waterfall. Had fruit in May.

## ROTTLERA.

*Rottlera paniculata*, Roxb. (*Mallotus cochinchinensis*).
20. *Ricinus dioicus ?* Forst. Fl. Austr. p. 67.

Stem: sub-arboreous; branches unarmed, nodding. Leaves: scattered, petioled ovate trapezoid (in young trees three lobed, acuminate, sub-peltate, repand above smooth, below hoary; marked at the base with two very small glands. Petioles slender, downy, spreading, drooping at the point; a little shorter than the leaves. Flowers small male and female on different trees. Panicles: terminal, diffuse; composed of spikes, scattered, interrupted. In the Male flowers: Calyx perianth three leaved; leaflets obovate. Corolla none. Stam: Filaments numerous, capillary, erect, the length of the calyx; beneath irregularly united into bundles; Anthers roundish, two lobed. In the Female flowers Calyx perianth five parted, leaflets lanceolate, very small, persistent. Corolla none. Pist: Germ irregular, muricated; Style hardly any; Stigmas three lacerated. Capsule tricoccous, muricated, three celled; two valved. Seeds solitary, roundish.

## POLYGAMIA—MONOECIA.

### MUSA, Schreb. 1653.

*Musa Paradisiaca*, Gmel. 2, 567, *M. sapientum.* Ibid.

The plantain or Banana. Pisang, Mal. This being a fruit highly esteemed, and in universal use the Malays enumerate an endless variety, each distinguished by a name, taken from the shape, colour, taste or some other quality of the fruit.

### TERMINALIA, Schreb. 1583.

*Terminalia catappa*, Gmel, 2, 701. A few trees cultivated.

### MIMOSA.

1. *Mimosa farnesiana.* Sown and planted for hedges.
2. *Mimosa pedunculata*, H. (*Parkia speciosa* Hassk.).

Arboreous, unarmed, leaves bipinnate, pinnae and leaflets many pair; peduncles terminal, solitary, very long. Pittay, Malay. M. biglobosa? Jacq. Amer. t. 179, f. 87.

Stem: arboreous, erect, tall, covered with a thick, rough bark. Branches: crowded towards the top of the stem, flexuous. Leaves: near the ends of the branches, scatterd, bipinnate; many paired (18-22) abrupt; pinnae many paired (22-36) abrupt; leaflets oblong, obliquely truncated, smooth, very much crowded, sessile. Petioles common, round, above, slightly; sprinkled with little rough points; much thicker at the base; above the base marked with an ovate, depressed smooth gland: partial filiform, thicker at the base, downy. Stipules none. Peduncles terminal, solitary, round, sprinkled with oblong, rough spots, longer than the leaves, nodding. Flowers aggregate, very much crowded, sessile, very small, of a whitish yellow, on a clubbed receptacle; forming an oval head about as large as an hen's egg. Bract an oblong, spathulate scale, beneath each floret, the length of the calyx, receiving the lower side of its tube. Hermaphrodite flowers the uppermost in the head (i. e. farthest from the peduncle, though as the flowers droop, this part in situ, becomes the lowest). Cal: Perianth tubular; mouth five cleft; segments, obtuse, the two undermost larger. Cor: Petals five, lanceolate, erect, coalescing with each other and with the cylinder of stamina; length of the Calyx. Stam: Filaments ten, longer than the Corolla, united into a cylinder for half their length; Anthers oblong, incumbent. Pist: Germ oblong, pedicelled; Style awl-shape, Stigma sharp. Legume oblong, pointed, compressed, subfoliaceous interrupted with isthmi. Seeds: many, oval, compressed, surrounded with a fleshy pulp. Male flowers below the hermaphrodite, shorter, forming a neck between the head of hermaphrodite flowers and a smaller one below yellow.

Calyx and Corolla as in the hermaphrodites. Stamens filaments as in the hermaphrodites; only their sheath is wrinkled within. Anthers as in the hermaphrodite. Neuter flowers below the male, forming a smaller head, whites. Calyx and Corolla as in the hermaphrodites. Stam: Filament as in the hermaphrodites, but much longer and flexuous. Anthers none. Pist: A very short cylindrical rudiment, in the bottom of the tube.

Flowers in May and December. The Malays are very fond of the seeds, which taste something like garlic, and of the pulp which surrounds them.

3. *Mimosa ? articulata*, H. (*Pithecolobium lobatum*).

Arboreous, leaves bipinnate, conjugate with leaflets three pair; Legumes articulated, curved, unilateral.

Stem: Arboreous, small, crooked. Branches: numerous, irregularly spreading. Leaves: scattered, bipinnate, abruptly conjugate, pinnae abruptly three paired; leaflets ovate, pointed, smooth. Peduncle: lateral, short; bearing from one to three Legumes, jointed, much curved, joints adhering laterally to the peduncle, which runs along the concave side of the curve; the outer side of the joints rounded, with deep notches between. Seeds: one in each joint, roundish, compressed. Not having seen the flowers the genus is doubtful.

The joints of the Legumes are sold in the Market under the name of Choorin, (Jering) the Malays being fond of the seeds, which have an astringent taste.

### Ficus, Schreb. 1613.

1. *Ficus lobata*, H.

Leaves sparse, long petioled, cordate, five lobed, subserrate, smooth above, tomentose below. Found near the waterfall.

2. *Ficus malaica*, H.

Leaves elliptic, pointed, most entire, smooth; Fruits axillary, in pairs, sessile, ovate. (Neither sufficiently well described to identify).

## CRYPTOGAMIA—FILICES

### Acrostichum, Schreb.

Smith Tracts, p. 230. "Fructifications forming one continued spot of no determined figure occupying almost all the disc of the leaf. Involucrum none, except little scales or hairs interspersed among the capsules."

1. *Acrostichum aureum,* Gmel. 2, 1295.

"Pinnas alternate, tongue-shaped, quite entire smooth" Petiv. fil. 142, t. 8, f. 5. Plum. fil, 87, t. 104, Amer. 5, t. 7, Pluk. Alm. 2, 288. f. 2. Found in thickets of underwood; and by the road side.

2. *Acrostichum calamarium,* H. (*Gleichenia* sp.).

Frond dichotomous, bipinnate, tendril bearing; leaflets linear, entire, parellel. Compare. *Acrostichum furcatum* Linn. Gmel. 2, 1296. Pium. Amer. 13, t. 20, Tel. 22, t. 28. Petiv. fil. 51, t. 5, f. 4. Polypodium dichotomum. Swartz. Prod. 133. Thumb. jap. 338, t. 37. Filix calamaria. Rumph. 6, 85, t. 38. Stipe; round, smooth, suffruticose, pithy, terminating with a tendril. Frond: dichotomous, bipinnate; leaflets opposite nearly joined at the base, linear, entire, smooth. The stipe grows to a length of twelve or fourteen feet. It is first erect, but as it lengthens, it falls down, and runs along the ground. Having the structure of a reed, it is used by the natives to make writing pens. Grows on the hill.

The description given by Rumphius of his Filix calamaria agrees with mine in many respects; but in his figure, the leaflets are more completely united at the base and broader in proportion to their length; his fronds are not so regulary dichotomus throughout; and he has a long portion of naked stipe between the subdivisions of the fronds, which do not occur in mine.

The *Acrostichum fucatum* of Linneus (*Polypodium dichotomum* of Swartz. and Thunberg) as far as I can judge from the figure of Thunberg, differs from mine in nearly the same particulars as that of Rumphius. And in my plant the fructifications cover the whole lower surfaces of the pinnae, constituting a true Acrostichum.

### POLYPODIUM, Schreb. 1632.

Smith, Tracts p. 231. "Fructifications in roundish, scattered, not marginal spots. Involucrum umbilicated, separating on almost every side."

1. *Polypodium phyllitidis ?* Gmel. 2. 1305. (Probably *Thamnopteris Nidus-avis* L.).

"Fronds lanceolate, smooth, most entire, fructifications scattered."

Root: fibrous. Stipes: several, columnar, furnished with many lanceolate, caducous scales. Frond: simple, undivided, lanceolate, pointed, most entire; smooth; with veins below, opposite parallel, spreading. Fructifications: crowded.

2. *Polypodium ; an tenellum,* Gmel. 2, 1310.

"Fronds pinnate, leaflets alternate, remote, linear, acuminate, waved." Forst. Prod. N. 440.

Root: fibrous. Fronds: numerous, about a yard in height, lanceolate, pinnate. Stipe near the base furrowed in front, higher up cylindrical; eight or nine inches of the lower part bare. Pinnae: alternate, remote, linear, acute, most entire, smooth; the upper smaller. Fructifications: scattered; generally in four rows, two on each side of the nerve.

The trivial name given by Forster does not suit my plant, which is pretty strong. Therefore I suspect they are distinct species.

### HEMIONITIS, Smith p. 235.

"Fructifications in scattered branching lines each of them double, with a vein running between."

"Involucra originating from the vein, and each separating outwards."

*Hemionitis pinnatifida,* H.

Frond pinnated, lanceolate; pinnae alternate, lance linear, pointed, pinnatifid; segments spatulate, obtuse, approximate.

I think the generality of the involucra open on both sides, the vein running up the middle; and therefore have placed it under this genus. But in several instances they appear to be attached laterally to the vein, and open on one side only viz., that which is remote from the vein, which is toward the nerve or margin, according as the fructification is on the inner or outer side of the vein. This having been noticed in the dried specimen, I suspect it has happened from one side of the fructification having dropped off.

### BLECHNUM, Schreb. 1627.

Smith, p. 237. "Fructification in longitudinal uninterrupted lines, close to the nerve.

"Involucrum originating from the surface, continued, separating towards the nerve."

1. *Blechnum petiolatum*, H.

Fronds: pinnated, pinnae lance linear, blunt petioled. Stipe: erect, smooth; behind convex, infront furrowed. Frond: pinnated; pinnae nearly opposite; five pairs with an odd one, lance linear, blunt, most entire, smooth, petioled. Petioles: short, slender, round below, furrowed above. Fructifications: in two lines, nearly parallel one on each side of the nerve, but remote from it.

2. *Blechnum orientale?* Gmel. 2, 1300. Reich. 4, 398. Osbeck voyage.

Agrees with Osbeck's description, except that the pinnae are often much longer than he mentions, being seven or eight inches in length.

3. *Blechnum longifolium*, H.

Frond pinnated; pinnae alternate, remote, broad linear, most entire, smooth.

Stipe: slender, erect, furrowed on both sides. Frond: pinnated, pinnae alternate, remote, sessile, sub-decurrent, broad linear, most entire, smooth, spreading, about a foot in length. Fructifications: close to the nerve on both sides.

### DAVALLIA, Smith p. 245.

"Fructifications in roundish separate spots near the margin. Involucra like scales, from the surface distinct separating outwards."

*Davallia multiflora*, Roxb.

"Fronds linear lanceolate; pinnae alternate; anterior angle of the truncated base enlarged."

Found on the hill.

### OPHIOGLOSSUM, Schreb. 1621.

1. *Ophioglossum scandens*, Gmel. 1291. Hort. Mal. t. 33.

2. Smaller than the former, but resembles it so nearly as to make rather a variety than a distinct species. Both found near the waterfall.

### LYCOPODIUM, Schreb. 1615.

Of this I have six distinct species, but the only two that I am able to ascertain with much probability are.

1. *Lycopodium cernuum*, Gmel. 2, 1289. Reich. 4, p. 444.

Of the figures quoted to this species the following agree best with mine; Pluk. Alm. t. 431, f. 3. Moris. hist. 3, p. 624, Sect. 15, t. 5, f. 6. Bellan Patsja. Hort. Mal. 12, p. 73, t. 39.

2. *Lycopodium ornithopodioides ?* Gmel. 2, 1290, Reich. 4, 447. Dillen. t. 67, f. 1, B.

# ASPIDOMORPHA MILIARIS.

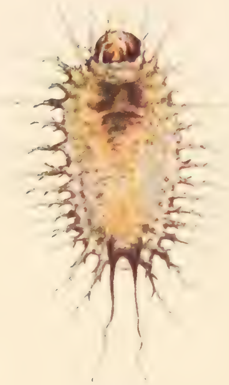


FIG. 1.

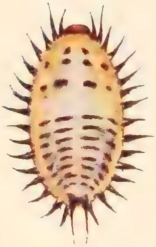


FIG. 2.

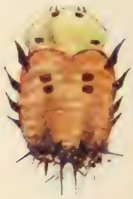


FIG. 3.

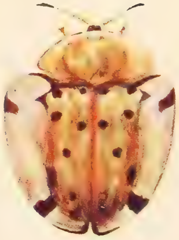


FIG. 4.

| | |
|---|---|
| FIG. 1. | Very young larva. × 17. |
| FIG. 2. | Older larva (3rd week.) × 2½. |
| FIG. 3. | Pupa. × 2. |
| FIG. 4. | Adult insect. × 2. |

# Some notes on the Life History of the Aspidomorpha Miliaris.

BY CAPTAIN C. F. BISHOP, R.G.A.

This is a medium sized beetle a little less than half an inch in length and breadth, of orange colour marked with black spots.

In the classification of the Cambridge Natural History it belongs to:—Order Coleoptera, Sub-Order Phytophaga, Family Chrysomelidae, Subfamily Cryptostomes, Group Cassidides.

## Description.

Its head and neck are protected by a chitinous shield, which encircles the neck, and beneath which the head can be entirely withdrawn. The thorax and abdomen are entirely covered by strong chitinous elytra, which fit closely along the margin of the head shield, and together with it form a more or less hemispherical covering.

The head shield is semi-transparent and has no black spots on it. The portions of the elytra that cover the thorax and abdomen are of a dull whitish colour which changes to a bright orange as the insect grows older, and these inner portions are each ornamented with, as a rule, eight small black spots, (Fig. 4), (some specimens have only six spots), while the outer rims of the elytra, which are semi-transparent, have each two somewhat larger black spots, and a thin edging of black. The male and female are almost indistinguishable having no difference in their markings, but the female is, as a rule, slightly larger than the male.

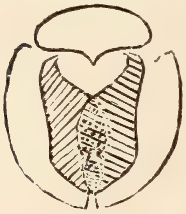
The largest specimen yet seen by the writer measured 12·5 mm. from front of head shield to the extremity of elytra, and 11·5 mm. across the widest portion of the elytra; the width of the abdomen being 6 mm. This was a female.

The smallest perfect specimen measured 9·5 mm. by 8·5 mm. breadth of abdomen being 4 mm. This was a male.

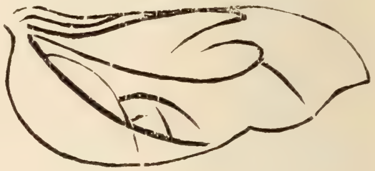
The largest males are however larger than the smallest females.

The antennae, length from 3 to 3·5 mm. consist of eleven segments. The first segment, fitting into the head between the eyes with a ball and socket joint, is a long and thick one, the second small, almost spherical; the next four are short and thick, the remaining five rather thicker and covered with fine hairs, the last being long and pointed.

The last four segments of the flagellum are coloured black, all the other segments being transparent.



(*a*)



(*b*)

The wings of the insect have two main folds when lying shut against the slightly convex dorsal surface of the abdomen, one fold running from the apex to nearly the centre of the posterior margin, the other fold across from about a third of the anterior margin from the apex almost parallel to the posterior fold. Each main fold has a fan-like fold in it, before turning under the other portion of the wing.

The veins of the wing are strongly marked, all lying within that portion of the wing which lies flat on the abdomen.

The diagrams above (not to scale) show (*a*) the positions of the wings lying flat on the abdomen, and (*b*) one wing extended, with its venation.

## Larva.

The eggs from which the larvae hatch out, are laid in bunches. The size of each egg is about 2 mm. long, and ·6 mm. in greatest diameter.

The larvae are, at first, of a uniform light greenish yellow colour, semi-transparent so that when seen under the microscope by transmitted light, their internal organs appear as dark patches of varying size and shape. (Fig. 1).

They are very active, but if the proper food be near, they as a rule settle down in a flock together, and only move on as the surface of the leaf is eaten.

For the first few days of life they only eat half through the leaf, but as they grow larger they eat all but the largest veins.

The only food as yet found acceptable to them, though several have been tried, is the leaves of the *Ipomea carnea* (Woodrow), *I. superbiens* (Ferminger).

The larva, (Figs. 1 & 2) is oval in shape, with six legs, and has 32 processes projecting in all directions from the circumference of its body. These processes are furnished with spines, and vary slightly on each successive larval skin. In the youngest forms they are of unequal lengths, and longer in proportion to the size of the body, while in the later forms, they become more regular in size and shorter in proportion.

In addition to these the larva has a forked process projecting from the dorsal surface of the abdomen, which in the young forms is very long and slender, and in all forms slightly longer than the lateral processes.

This forked process by means of which the Cassidides are commonly said to cover themselves with a shelter or sunshade of excrement, is not much used in that manner by this species. The process is used in throwing off each old larval skin, during which proceeding the skin is often retained on the process for a considerable time, but the larvae almost invariably obtain shelter from the sun and rain by remaining on the under surface of the leaf they are living on, and the forked process is, as often as not, quite clean.

Larvae take from 18 to 21 days to arrive at maturity and stop feeding, during which time they shed their skins some 5 or 6 times, increasing in size and developing black marks on the dorsal surface of the abdomen. They then attach themselves to a leaf by a false foot dropped from the abdomen behind the legs, and this state lasts approximately 48 hours, after which the pupa emerges from the last larval skin but does not separate from it, the skin being retained at the extremity of the abdomen, as the connection between the pupa and the leaf, on which it remains stationary.

## Pupa.

The pupa stage (Fig. 3) lasts from 4 to 5 days, as a rule, though some few exceptions remain as long as 7 days and yet eventually turn into the fully developed imago.

During the pupa stage no external changes take place, except that on the ventral surface the limbs of the insect may be observed developing.

## Imago.

The imago when it is ready to burst forth from the pupa, begins to stretch and strain until it breaks the pupa skin near its head. It then pushes out its head and chitinous head shield until it can release its antennae and front pair of legs.

The elytra may then be observed to be quite soft, folded closely around the thorax and abdomen, and as it emerges from the pupa skin the elytra gradually spread out, while at the same time the insect pulls out its second and third pairs of legs.

Until the actual process of emergence has been closely watched, it is hard to realize how so large an insect can have come out of so small a pupa case.

The imago is at first of a clear yellow colour without a spot visible on it. The black spots appear in about an hour, but if the insect be observed under a microscope the positions of the spots which are to come are found to be marked by pores in the elytra which have a speck of black pigment visible. There are some 15 or 16 of these pores to each black spot.

About half an hour after emerging from the pupa the insect unfolds its wings so that the ends emerge beyond the elytra, but it does not, at this stage, attempt to fly, or even to open its elytra which are still quite soft and liable to be creased and deformed.

At this stage also, if laid on its back, the insect is incapable of turning over, unless it can reach something to hold on to with its feet, the elytra not being strong enough to aid it in turning over. The elytra harden in about a week or ten days, but the insect takes considerably longer to reach maturity.

## Habits.

Females about the end of their fourth week of life, begin to lay egg bunches, even though they have been kept quite separate from the male. These eggs are unfertile.

About the same time, or perhaps a little sooner, the males begin to try to copulate.

When both male and female have fully reached maturity they breed fairly rapidly.

They appear, as a rule, to copulate in the heat of the day, never being observed *in coitu* before 9:30 or 10:0 a.m., and seldom before noon.

They remain *in coitu* for several hours, almost invariably till after 10:0 p.m.; the longest time observed being from 10:30 a.m., till 10:30 p.m., but the time of separation was not then observed.

This occurs perhaps for several successive days, then, as a rule, no copulation takes place for some 24 hours, after which the female lays an egg bunch.

Copulation again begins within 5 or 6 hours of the egg bunch being completed.

This excessive copulation observed to be the rule with almost all pairs kept in captivity by themselves, may not be so prevalent in a state of freedom if the females are more numerous than the males, especially as it appears to be quite unnecessary.

The female is provided with a spermatheca which is fertilized by the male, so enabling her to lay several fertile egg bunches after complete separation from the male.

A female isolated on the 2nd June laid egg bunches on 6th, 9th, 13th, and 15th June, all of which contained fertile eggs which hatched out in due course.

A female isolated on 23rd May, laid egg bunches on 26th and 30th May, 2nd, 4th, 8th, and 11th June, all of which hatched out.

## Egg Laying.

The eggs are laid in bunches of variable sizes, usually containing from 30 to 50 eggs, but as the female grows old the bunches often decrease in size, some only containing about 10 eggs.

The method of procedure is as follows:—Starting with her abdomen depressed on to the surface on which she is standing, the insect raises a concave vertical shield of chitin exuding it from her cloaca as she raises her abdomen. This is repeated 3 or 4 times, each shield adhering to the last and overlapping it slightly to one side or the other. The abdomen is then raised and an egg exuded from the ovipositor which directs the egg into its proper vertical position as the abdomen is again lowered.

After each egg is laid another sheet of chitin is erected as a covering.

The eggs are laid in four rows, not in succession from one side to the other, but always in the same order throughout the laying.

The rate of laying is from 1 to 2 minutes for each egg, made up as follows:—

| | | | | |
|---|---|---|---|---|
| Depositing egg | 10 | to | 20 | seconds |
| Covering with chitin | 40 | to | 80 | seconds |
| Interval before next egg | 10 | to | 20 | seconds |

Having deposited the last egg, two or three layers of chitin complete the egg bunch, which is normally a compact mass measuring about 5 mm. by 4 mm. in transverse section, and from 4 to 7 mm. long.

The time occupied in laying a normal egg bunch varies from 40 minutes to 1½ hours.

Egg bunches take from 10 to 13 days to hatch out.

The number of egg bunches laid by one female varies considerably. Many of the pairs of insects kept, during captivity, in Petri capsules either died after a few days, escaped when their food was being changed, or were killed for dissection and study of their anatomy. The following are a few examples of the number of egg bunches laid by females which lived for two or three weeks:—

| | | | | |
|---|---|---|---|---|
| A female kept for | 39 | days, laid | 13 | egg bunches in that time. |
| do. | 18 | do. | 3 | do. |
| do. | 18 | do. | 3 | do. |
| do. | 28 | do. | 11 | do. |
| do. | 20 | do. | 7 | do. |
| do. | 25 | do. | 6 | do. |
| do. | 28 | do. | 8 | do. |
| do. | 16 | do. | 5 | do. |

Shewing an average of one egg bunch every 3½ days.

The longest lived of any of the insects kept in captivity was a female, which lived for 110 days, during which time she was twice paired, and laid 23 egg bunches in 75 days.

An exceptional pair, both of which died after being kept for 12 days, were observed *in coitu* for 9 consecutive days, but no egg bunch was ever laid.

An experiment of confining together 3 males and 3 females, distinguished by paint marks of different colours, shewed that they paired indiscriminately, and as freely as when kept by separate pairs.

## Mortality.

After keeping the insects in captivity for about 5 months some 60 or 70 were put out free upon four small bushes of *Ipomea carnea*, and observed for the next 7 months.

Their habits as noted when kept in captivity, appear to be much the same when living in a state of freedom, though owing to their moving from one bush to another, and to the impossibility of distinguishing individuals, no very accurate observation could be made.

From the numbers of egg bunches found on the leaves it would appear that they breed at the same rate when either free or in captivity; the great difference between the two states being in the mortality during the larval stages of life.

During the earliest attempts at rearing the insects from the eggs, a very high rate of mortality was found to be the general rule. Egg bunches kept in a moist condition and exposed to the sun by day failed to hatch out at all. Young larvae similarly exposed to too great heat or moisture often lost 80 or 90 per cent of their numbers in the course of 24 hours. Young larvae if left too near to water at night, were frequently found with 50 per cent of their numbers drowned the next morning.

Consequently out of a great many egg bunches, which hatched out an average of 30 to 40 larvae each, it was frequently the case that no more than 5 or 6 per cent reached the stage of pupa.

This very high rate of mortality was found to be, to a considerable extent, avoidable with extra care, the eggs being kept in well corked specimen tubes until they hatched out, the very young larvae being kept completely isolated from ants, with but little moisture, and plenty of shade.

Yet even when better methods of preserving them were practised, the mortality among young larvae was still, in most cases, as high as 30 or 40 per cent, apparently from natural causes, variations in weather, or in the quality of the food.

There is a considerable mortality too during the changes from larva to pupa, and from pupa to imago, in the free state as well as when in captivity; the following instances were noted :—

During the change from larva to pupa :—

| | | | | |
|---|---|---|---|---|
| Out of | 20 | larvae | 4 | died |
| do. | 5 | do. | 3 | do. |
| do. | 12 | do. | 1 | do. |
| do. | 20 | do. | 2 | do. |
| do. | 37 | do. | 1 | do. |
| do. | 41 | do. | 1 | do. |

Average nearly 9 per cent.

During the change from pupa to imago :—

| | | | | |
|---|---|---|---|---|
| Out of | 16 | pupa | 4 | died |
| do. | 11 | do. | 6 | do. |
| do. | 18 | do. | 0 | do. |
| do. | 36 | do. | 2 | do. |
| do. | 23 | do. | 0 | do. |
| do. | 40 | do. | 3 | do. |

Average over 10 per cent.

The mortality when living in freedom is very much greater than under artificial conditions, even when care is exercised.

The *Euchromia orientalis* lays its eggs on the Ipomea carnea, and the larvae of this insect are most voracious feeders, so that the egg bunches of the *Aspidomorpha* often get so isolated by the leaf around them being eaten away, that the young larvae when they hatch out, stand but little chance of ever reaching food.

Egg bunches are sometimes found with the eggs destroyed and occupied by the pupa of a small parasitic Hymenoptera of the Family Proctotrypidae. This insect penetrating the chitinous covering of the Aspidomorpha's egg bunches, lays its eggs in the bunch.

Rain storms, when windy weather exposes the under surface of the leaves, wash off whole colonies of young *Aspidomorpha* larvae.

Probably many larvae are destroyed by birds, though no actual instances of this have yet come under the obervation of the writer.

Of 60 or 70 insects put out to live in freedom, at first a good many disappeared. For some months afterwards the numbers gradually increased, but owing to the Ipomea bushes being very small, their growth was not able to keep pace with the destruction of their leaves, and after 7 months the total number of *Aspidomorpha* remaining had decreased to between 40 and 50, with a fair proportion of egg bunches, but very few larvae or pupæ.

# Notes on Malay History.

By C. O. Blagden.

## I. Introductory.

About a dozen years ago a comparison of the details of Malay history as given in the Sĕjarah Mĕlayu ' (or "Malay Annals") with the information contained in the Notes on the Malay Archipelago and Malacca (extracted and translated from various old Chinese sources by Mr. W. P. Groeneveldt) and with the section in the Commentaries of Alboquerque relating to the history of Malacca led me to the conclusion that the usual chronology, which dated the fall of Singapore and the foundation of Malacca in the year 1252 A.D. or thereabouts, was hopelessly untenable. The evidence available seemed to make it pretty clear that these events must be put somewhat more than a century later, probably somewhere about the year 1377 A.D., in fact. A short paper embodying this conclusion and some of the arguments leading to it was read by me before the XIth Oriental Congress at Paris in 1897, and subsequently appeared in the printed transactions of that congress.

The arguments, in outline, were these. First, the received chronology gave absurdly long reigns to the Malacca Rajas: for instance four generations of them, from Sultan Muhammad Shah to Sultan Alauddin Shah inclusive, are made to cover a space of 201 years; which is extremely improbable and next door to impossible. Similarly the life of the great Bĕndahara Paduka Raja, a leading minister of state in Malacca in the 15th. century and one of the most striking figures in the Sĕjarah Mĕlayu, would (if we accept the ordinary chronology) cover about 130 years, during more than 100 of which he must have held the office of Bĕndahara! This is manifestly absurd. Secondly, the Chinese records, which in some cases are contemporary with the events they relate, give a list of the names of the later Malacca Rajas. These names (with the dates attached to them) make it clear that their reigns fell within the 15th. century and did not extend to the abnormal lengths that the ordinary chronology makes out. Thirdly, there is no mention of Malacca anywhere, in any authority that has hitherto come to light, prior to the early years of the 15th century. (1) This negative evidence, for what it is worth, supports the view that Malacca was not founded (or at any rate did not rise to the position of an important commercial emporium) much before the beginning of that century. On the other hand we find mention of the State of Pasei (better Pasè) in Sumatra at an earlier date. An abstract of its history is inserted in the Sĕjarah Mĕlayu as a sort of episode just before the account of the fall of Singapore. According to this account, with which the Hikayat Raja-raja Pasei in the main agrees, the first Muhammadan ruler of Pasei was a person who on his conversion to Islam took the name of Malik-al-Salih. His successor was his son Malik-al-Dzahir. Now the last named was reigning and was already a fairly old man when he was visited by the celebrated Arab globe-trotter Ibn Batutah in 1345 or 1346 A.D. The inference is that Muhammadanism became the established religion in Pasei somewhere about the year 1300 A.D. The Commentaries of Alboquerque record a native tradition that Iskandar Shah, one of the early Rajas of Malacca, was converted from Hinduism to Islam on the occasion of his marriage with a daughter of a Raja of Pasei. Whether that be so or not, the general trend of tradition goes to show that Pasei was regarded as being an older state than Malacca. All this evidence combined negatives the ordinarily received view that Malacca became Muhammadan in the reign of a Raja whose accession according to the commonly accepted chronology took place in 1276 A.D. or thereabouts. Fourthly, the Hikayat Raja-raja Pasei, which however is a work of uncertain and probably rather late date, speaks of a Javanese expedition of conquest successfully directed against Pasei, Jambi and Palembang, and shortly afterwards speaks of the conquest by the Javanese of the dominions of the Raja of Ujong Tanah. This latter country is of course the southern extremity of the Malay Peninsula, known since the 16th century as Johore, and the dominions of its Raja included a number of island groups, such as the Riau-Lingga Archipelago, the Natunas, Anambas, etc., which are duly enumerated in the Hikayat Raja-raja Pasei. Now we know from Groeneveldt's Chinese sources that Palembang was taken by the Javanese in the year 1377 A.D. The inference is that the conquest of Ujong Tanah and its insular possessions (which must have included the island of Singapore) took place shortly after 1377 A.D. The foundation of Malacca must then be put at some intermediate date between 1377 and 1400 A.D.; and the establishment of Muhammadanism in that State cannot have taken place very many years before the close of the 14th. century. When first visited by Chinese envoys in the first decade of the 15th. century, it was a Muhammadan State.

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(1) A possible exception, which I had not at that time seen, is dealt with in the present paper. It does not affect the argument.

### II. Allusions to Malays in the "Pararaton."

I propose here to draw attention to a few additional data which confirm the conclusions already stated and throw a little more light on a very obscure period of Malay history. At the time of reading my paper I had not had access to the Javanese historical work styled the "Pararaton" (i.e. Book of Kings), which has been edited and translated (with the addition of copious and valuable notes) by the late much lamented Dr. J. L. A. Brandes, a most eminent authority on the history of the Eastern Archipelago. This appeared in 1896 in Deel XLIX of the Verhandelingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen. It is a work of uncertain date and authorship, but is probably in part based on more or less contemporary records of the events it relates, and is certainly older than 1600 A.D. It is of no great length; but it is one of the few professedly historical works in this part of the world that can really lay claim to some historical value. (Most Javanese and Malay histories are a blend throughout of fact and myth; but in the Pararaton only the beginning bears the stamp of being merely legendary). It contains a large number of dates and covers the period 1222-1481 A.D. (in the original 1144-1403 Çaka). This period includes the time when the great Javanese State of Majapahit was founded and flourished ; and the Pararaton gives many interesting details about the history of Java during this epoch.

Its allusions to Malay history are unfortunately ' (as is natural) much scantier. I will give them here briefly.

The first one occurs in the account of the reign of Çri Kĕrtanagara, the last king of Tumapĕl, who reigned ' (according to the Pararaton) from Çaka 1194 to 1197 ' (1272-1275 A.D.) This king, we are told, "sent his troops against Malayu." The immediate result of this unwise expedition, which left Tumapĕl almost defenceless ' ("there were very few men left at Tumapĕl, most of them having been sent to Malayu"), was the fall of his kingdom in the same year at the hands of another Javanese Raja, one Jaya Katong, of Daha. "The expedition against Malayu and the fall of Tumapĕl occurred in the same year, 1197 Çaka," i. e. 1275 A.D. Assuming this date to be correct, the expedition must have been on a considerable scale, and not a mere raid, for the troops, we are told, did not return till many years later, apparently in 1293 A.D. They brought back with them, as part of their booty, it may be presumed, two Malay princesses : one of these, by name Dara Pĕtak was, subsequently married to Raden Wijaya, the first king of Majapahit, who bore the royal style of Çri Kĕrtarajasa ; the other, called Dara Jingga, became the wife of a high chief and the mother of the prince Tuhan Janaka, styled Cri Marmadewa, with the title of Ratu ring Malayu, and afterwards also styled Aji Mantrolot.

There is nothing to show us which Malay state in particular was the victim of this onslaught. But as from the close of the 7th century at least (and perhaps earlier) and for many centuries later the term "Malayu" was especially applied to the homeland of the Malays, i. e. Central Sumatra north-west of Palembang, it is probable that the Javanese expedition was directed against this region. In any case some part of Sumatra is almost certainly intended.' During the interval between the despatch and the return of this expedition stirring events had occurred in Java. Majapahit had been founded and the wellknown invasion of the island by the forces of Kublai Khan, the Mongol Emperor of China (called in the Pararaton " Ratu Tatar " ) had taken place. It is described in the Pararaton, but its details do not concern us here.

I ought perhaps to add that while it seems to follow from the account in the Pararaton that King Kĕrtanagara was killed by his enemies of Daha at the time when Tumapĕl fell, the facts are really otherwise. We know from an inscription dated Çaka 1272 ' (1350 A.D. ), reproduced with transliteration, translation and commentary by Professor Kern in the Bijdragen tot de Taal-, Land-en Volkenkunde van Nederlandsch-Indië ' (Deel LVIII), that he did not actually die till the year Çaka 1214' (1292 A.D.), shortly before the arrival of the Mongol expedition' (which reached Java in 1293 A.D.). This seems to throw some doubt on the correctness of the date on which the expedition is supposed to have been despatched to " Malayu." But the point is not really very material.

The next mention in the Pararaton of Malay countries occurs in or after the account of the reign of a certain queen of Majapahit styled, (from her place of residence) Bhreng Kahuripan, whose reign began in 1331 A.D. In the year 1346 A.D. the celebrated Gajah Mada, whose name is familiar to the readers of Malay chronicles (which wrongly introduce him into their somewhat legendary accounts of the 15th. century ) became *apatih amangkubhumi*, that is to say prime minister, of Majapahit. On a certain undated occasion ' (but certainly after 1334 and presumably after 1346 A.D. ) we are told that " Gajah Mada, the apatih amangkubhumi " made a now that he would eat no *palapa* ' (whatever that may be) " until Nusantara shall have been subdued, until Gurun, Seran, Tañjung Pura, Haru, Pahang, Dompo, Bali, Sunda, Palembang and Tumasik shall have been subdued ; then will I eat *palapa*," said he.

Of these names, Nusantara is believed to denote the Archipelago generally, Gurun is Goram, Seran is Ceram, both in the Moluccas, Dompo is a state in the island of Sumbawa, Bali is the island lying immediately to the east of Java, Sunda is the western end of Java itself, and Palembang is of course the well-known place of that name in south-eastern Sumatra. Haru, which is often mentioned in the Sĕjarah Mĕlayu, was a state on the east coast of Sumatra, Tañjung Pura is evidently Borneo or some particular spot in Borneo, where a place bearing that name did in fact exist. (I follow here the identifications given by Brandes). The names that particularly interest us are Pahang and Tumasik: the former requires no comment, the latter is certainly Singapore. In the Sĕjarah Mĕlayu the old name of Singapore is given as تماسک، which the Malays nowadays pronounce Tĕmasak. It is evident, however, that there has been a break in the tradition here: they ought to call the place Tĕmasek, as it is printed in the Romanised (1898) edition of the Sĕjarah Mĕlayu, for that would be the proper Malay equivalent for the Javanese form Tumasik, and we shall meet with the latter form again in another Javanese work in the same connection. Brandes derives the name from *tasek*, "sea", and imagines an identification with Samudra' (near Pasei) but refers to the possibility of Singapore being meant. The Encyclopædie van Nederlandsch-Indië (s. v. Tochten, vol. IV, pp. 383-4), following Professor Kern, correctly identifies it with Singapore.

Evidently, (and this is important as confirming the amended chronology of the Peninsula), Singapore was still in existence as a state unsubdued by Majapahit at the time when Gajah Mada made his vow, somewhere about the year 1346 A.D. probably. It could not therefore have been finally destroyed by the forces of Majapahit in 1252 A.D. (in which year, it may be remarked, Majapahit had not yet been founded).

Most unfortunately there is at this point a lacuna in the text of the Pararaton and nothing whatever is told us of the important events which took place in pursuance of Gajah

Mada's declared policy of conquest, except that in 1357 A.D. he picked a quarrel with the Sundanese which ended in a bloody battle wherein they were defeated and slaughtered, and that in the same year an expedition from Majapahit conquered Dompo. "Thereupon," we are told, "Gajah Mada again made use of *palapa.*"

Are we entitled to infer that the whole of this great minister's programme of aggressive imperialism had been carried out at that date? Alas, no: for we know from Chinese sources that Palembang was not conquered till 1377 A.D., nine years after Gajah Mada's death' (which the Pararaton puts in Çaka 1290, i. e. 1368 A.D.). It would seem that he was not particular in adhering to the very letter of his vow (assuming it to be correctly reported) but was content to put up with an instalment of his ambitious plan. Unfortunately the Pararaton thus leaves us in the dark as to the precise date when Singapore was taken and destroyed; but it makes it plain that the event must have happened in the 14th and not, as the old chronology has it, in the 13th century. I have already mentioned the fact that the Hikayat Raja-raja Pasei puts the conquest of "the dominions of the king of Ujong Tanah" shortly after that of Palembang. But it does not specifically mention Singapore, though its list of the islands conquered on this occasion includes Timbalan, Siantan' (in the original, Siatan), Jĕmaja, Bunguran, Sĕrasan, Subi, Pulau Laut, Tioman, Pulau Tinggi, Pĕmanggilan, Karimata, Bĕlitong, Bangka, Lingga, Riau, Bintan and Bulang.

### III. The Evidence of the "Nāgarakrĕtāgama."

Probably we shall never know the exact date of the fall of Singapore. But the evidence available may at any time be strengthened by some accidental discovery of a hitherto unknown record. Such a discovery occurred a few years ago when the Nāgarakrĕtāgama unexpectedly turned up. This is a panegyric poem composed' (according to the Encyclopædie van Nederlandsch-Indië) in the year 1365 A.D. by a Javanese court poet, a Buddhist bearing the name of Prapañcha, in honour of the then reigning sovereign of Majapahit. The king in question was Hayam Wuruk, known by the royal style of king Rajasanagara and also as Sang Hyang Wĕkasing Sukha, not to mention all his other titles. This monarch, who was a son of the queen already mentioned, appears to have ascended the throne at the age of 16 in the year 1350 A.D., his mother (who till then had acted as regent) having handed over the government to him in that year ; and he reigned till his death in the year 1389 A.D. It was during his reign that the power of Majapahit really culminated and its political expansion reached its widest extent.

The poem, written in the Javanese language of that period, is an important historical document. The unique manuscript containing it was discovered by the late Dr. Brandes among the books of the last Balinese ruler of Lombok, when that island was taken under the immediate control of the Dutch colonial government. Dr. Brandes published it in Deel LIV of the Verhandelingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen in 1902. Unfortunately he only gave the poem in the original Balinese script, without transliteration, translation notes or commentary, a circumstance which leaves it a sealed book except to an extremely limited number of specialists ; for it is given to few (even amongst Dutch scholars) to understand 14th. century Javanese and read the Balinese character readily. Under the circumstances one must be thankful that Professor Kern has given some information on the subject for the benefit of the general reader, who is not a Kawi scholar. In the Indische Gids for 1903 (I, pp. 341-360) he gave a general account of the contents of the poem, with particular reference to some of its geographical data, and in Deel LVIII (1905) and Deel LXI (1908) of the Bijdragen tot de Taal-, Land- en Volkenkunde van Nederlandsch-Indië he returned to the subject and dealt more particularly with some of the genealogical and chronological details contained in the poem. Colonel G. E. Gerini further dealt with some of the geographical data of the Nāgarakĕtāgama, especially those connected with Siam and the Malay Peninsula, in a paper published in the Journal of the Royal Asiatic Society (July 1905), to which I wrote a reply contesting his claim of an ancient Siamese occupation of the whole Peninsula (J. R. A. S., January 1906). In the Encyclopædie van Nederlandsch-Indië (s. v. Tochten, vol. IV, p. 384) the geographical data relating to the Archipelago and the Peninsula are again examined and some identifications suggested.

There is still scope for a few more remarks on these matters: the subject is one of local interest to the readers of this Journal, and some of the identifications that have been suggested require to be amended. The Nāgarakĕtāgama mentions a considerable number of places in the Eastern Archipelago and the Malay Peninsula as being subject to the empire of Majapahit. Beginning in Canto 13 with Sumatra, it specifies Jambi, Palembang, Tĕga, Dharmāçraya, Kandis, Kanwas, Manangkabo, Sīyak Rĕkan, Kampar, Pane, Kampe, Haru, Mandahiling, Tumihang, Parlak, Barta, Lwas, Samudra, Lamuri, Batan, Lampung and Barus. "These and some others lie in the land of Malayu," says the poem, as abstracted by Professor Kern. It then proceeds to deal with the dependencies on the island of Tañjungnagara, which is clearly the same as the Tañjung Pura of the Pararaton and is certainly Borneo, as the names of the several places on it sufficiently prove. They are: Kapuas, Katingan, Sampit, Kuta Lingga, Kuta Waringin, Sambas, Lawai, Kadangdangan, Landa, Samĕdang, Tirĕm, Sedu, Buruneng' (probably for Bĕrunai-Brunei), Kalasaludung, Solot, Pasir, Baritu, Sawaku, Tabalung, Tuñjungkute, Malano, and the capital town Tañjungpurī.

The poet next proceeds (in the second strophe of Canto 14) to enumerate a list of places, which like those in the two preceding lists, though not in strict geographical order, have evidently been grouped together because they belong to one definite region. This region, to which no general name appears to be attached, is the Malay Peninsula. The four lines in which they occur appear to me to read as follows in the printed text:—

ikang sakahawan Pahang pramuka tang Hujung Medini
re Lĕngkasuka len ri Sai mwang i Kalantĕn i Tringgano
Naçor Paka Muwar Dungun ri Tumasik ri Sang Hyang

Hujung Kĕlang Kĕḍa Jĕre ri Kañjapiniran sanuça pupul.

I cannot claim to be a Kawi scholar and it is quite possible that in my attempted transliteration I may have divided some of the Javanese words wrongly : the original runs most of them together without a break. But I am only concerned with the proper names which the passage contains, and as in the interpretation of some of these I venture to differ from previous commentators, it was necessary to quote the whole passage. The poet then goes on to detail the dependencies lying to the east-ward of Java, beginning with Bali and including a number of places in the Lesser Sunda Islands, the Moluccas and Celebes and even as far as New Guinea; in fact, covering practically the whole Archipelago except the Philippines. It is not necessary for my purpose to enumerate these places here. But the whole list gives a very good summary of the Archipelago as known to the Javanese in the 14th century of our era; and though in a good many cases the claim of supremacy may have been of a somewhat shadowy kind, yet the list is evidence of the predominant position held by the kingdom of Majapahit at this period.

To return now to the place-names more particularly connected with the Malay Peninsula: Pahang, Kalantĕn, Tringgano, Kĕlang' (nowadays less accurately written Klang) and Kĕḍa' (i. e. Kĕdah) are obvious and require no explanatory comment. It must not be assumed that they stand for the names of states: they probably represent the rivers, with tiny settlements at the mouth of each, that were the nuclei round which the respective states have developed. Hujung Medini is rendered by Professor Kern as "Hudjung, Tanah;" but I think the comma must be a misprint and agree with the Encyclopædie in interpreting it as the southern end of the Peninsula, the already mentioned Ujong Tanah, nowadays called Johore. "Medini" appears to mean the same thing as *tanah*. Lĕngkasuka has been rightly identified by Col. Gerinei with the Langkasuka mentioned in the Hikayat Marong Mahawangsa as an old capital of the state of Kĕdah. It lay near Gŭnong Jĕrai (Kĕdah Peak), a considerable way south of the Kĕdah

River, and that is no doubt the reason why the two are separately mentioned. The Encyclopædie conjecturally identifies Lĕngkasuka with Sĕlangor, which is certainly a mistake. Sai is one of the Patani states and lies to the north-west of Kĕlantan. At this point my reading differs from Professor Kern's. He reads the words *Sai mwang* together as one proper name, which he transliterates "Semong." But I know of no such place-name and take *mwang* to be a particle, as in the passage in Canto 13 which reads *Samudra mwang i Lamuri Batan Lampung mwang i Barus*. Where the text has, apparently, "Nacor," Professor Kern writes "Nagor." Perhaps "Naçor" was a misprint. If it is right I do not know what it stands for. Nagor has been identified by the Encyclopædie with Ligor and I have no alternative explanation to suggest. But there is a difficulty here: for a place called Dharmānāgarī mentioned in Canto 15 of the poem has also (by Col. Gerini) been identified with Ligor. Moreover Ligor was at this period certainly tributary to Siam and could not with any show of reason be claimed by Majapahit.

The next two names, which I take to be Paka and Muwar, are read as one expression "Pakamuwar" by Professor Kern. The Encyclopædie suggests that they represent "pĕkan Muar," that is to say a mart in the district of Muar or on the Muar river. I incline to think that they stand for two distinct places, viz. (a) Muar, which now forms part of Johore, (i.e. the mouth of the Muar river, not its upper course) and (b) a river on the East coast lying between Kĕmaman and Dungun in the state of Trĕngganu. Newbold (vol. ii, p. 60 of his well known work on the Peninsula "British Settlements in the Straits of Malacca)" spells it Pakaa; Skinner in his "Geography of the Malay Peninsula" (p. 29) calls it Paka; my friend Mr. W. W. Skeat informs me that the Society's map spells it Pake. The identification is conjectural, of course, and I put it forward with some diffidence. But it seems on the whole rather more probable than the "pĕkan" interpretation. The next name, Dungun, which is also a river-name, has just been incidentally accounted for and requires no further explanation. Tumasik, identified in this connexion with the Island of Singapore by Professor Kern, Colonel Gerini and the Encyclopædie, may safely be said to be determined beyond all doubt or question: an additional piece of evidence regarding it will be mentioned later. Jĕre may, as the Encyclopædie suggests, be Jĕring in the Patani states. But it might equally well stand for Gunong Jĕrai; only this district is already referred to by the mention of Lĕngkasuka.

Kañjapiuiran has received no satisfactory explanation as yet. Clearly, if it is a Malay place-name and not altogether corrupt, the expression must be a compound one, not a single word.

There remains only Sang (Hyang) Hujung. This is rather an interesting name. Professor Kern writes it "Sang Hyang Hudjun," but the original distinctly has a guttural nasal as the final of the last word. The Encyclopædie conjecturally identifies it with Ujong Salang, i.e. Junk Ceylon. For this there is no shadow of evidence or probability. We must look for it elsewhere. I lay no stress at all on the fact of the name occurring between those of Tumasik and Kĕlang: the Nāgarakrĕtāgama is a poem, not a geography book' (the more's the pity, for our purpose), and the exigencies of metre may have influenced the writer more than any considerations of topography. But the very form of the name appears to me to speak for itself. It is evidently the سنيڠ هوجڠ of the Sĕjarah Mĕlayu, which we must transliterate San-yang' (or Saniang or Sĕniang, not Sĕning) Hujong (or Ujong). Shellabear's Romanised edition of 1898 ' (pp. 43 and 81) has Sening Ujung. Leyden in his translation ' ("Malay Annals" 1821), being no doubt guided by native tradition, has on p. 88 Sangang Ujong and on p. 191 Senyang Ujong. In short it is the district now known as Sungai (or Sungei) Ujong, locally often called Sĕmujong (on the same principle that the title Yang di-pĕrtuan becomes in the Menangkabau dialect Yampituan and Yamtuan). This name Sungai Ujong has long been a puzzle to etymologists. If it meant anything, it could only mean "the river of the cape (or corner) or else "the Ujong river," whatever that might be. But there exists no river of that name: the name is not a river-name at all but the name of a small stretch of coast-line, and though there is an important cape there it has no river alongside of it. One popular etymology is reported by Mr. D. F. A. Hervey in No. 13 of this Journal, p. 241. But it is as impossible as most popular etymologies usually are and is moreover mixed up with an equally improbable explanation of the name of the state of Rĕmbau. It is really not worth repeating here, for the 14th century Javanese name explains everything. The modern name Sungai Ujong is evidently a corruption (through the 17th century San-yang Hujong) of the old Sang Hyang Hujung, which means much the same as our "Holyhead."

The reference is to the promontory usually called Cape Rachado, from the Portuguese name, which the Malays nowadays style Tanjong Tuan. It is a celebrated *kramat* or shrine and has of course its local legend. (1) Nowadays I fancy it is supposed to be the tomb of some orthodox Muhammadan saint or worthy. But in fact it is an old animistic holy place going back to very ancient times and owing its origin to a simple natural phenomenon. The reason for the special sanctification of the spot is incidentally given by Begbie' ("The Malayan Peninsula," p. 422) and Newbold' (op. cit., vol. ii, p. 38). It is merely that at this cape two strong and opposing currents meet and cause a dangerous eddy or race in which boats are liable to be upset. Hence it has naturally come about that, to use Newbold s phrase, "the Dattu Tanjong Tuan, the elder of Cape Rachado, is a saint of no ordinary celebrity among the sea-faring class of natives."

That exhausts the names connected with the Peninsula contained in the passage I have extracted from the Nāgarakretāgama. I gather from Professor Kern's abstract that the last two words imply that besides the places specified there were several groups of islands which the poet has not thought it necessary to name. Unfortunately these old names tell us very little about the condition of the Peninsula at the period when the Nāgarakrĕtagama was written. But they tell us something. We need not follow the loyal and courtly Prapañcha in claiming that Majapahit exercised a real supremacy over all these places; Palembang was not conquered by the Javanese until a dozen years later and yet it is included amongst the dependencies of Majapahit in the poem. It is equally improbable that such outlying places as Kĕlantan and Sai were genuinely subject to Majapahit. But the list of Peninsular names suffices at any rate to negative the view recently put forward by Mr. R. J. Wilkinson in "Papers on Malay Subjects" (History, Part I, p. 8) that the Malay colonisation of the Peninsula dates only from the year 1400 A. D. Evidently there were already in the middle of the 14th century a number of settlements scattered along the coast-line, both on the east and on the west side of the Peninsula. (It is noticeable that unlike the names relating to Sumatra none of the Peninsular names given in the Nāgarakrétāgama have any reference to the interior of the country: they are settlements on the coast or barely a few miles inland). Some of these settlements even then bore the same names as they do at the present day and one or two of these names are distinctly Malay. Langkasuka is no doubt of Indian origin, Nagor (if that be the right reading) is Indian modified by Indo-Chinese, pronunciation, Kĕlang Kĕdah and Jĕre may possibly be of Mon-Khmer origin, Sai is perhaps Siamese, and most of the others I would not try to explain. But Kĕlantan seems to be Malayan in form, and Dungun is the Malay name for a common seashore tree (according to Mr. H. N. Ridley in No. 30 of this Journal, pp. 87 & 44). Of course Sang Hyang Hujung is Malayan also, but it is just the sort of name that mariners give to a notable landmark and by itself it would not be evidence of actual Malay settlement but merely of Malay navigation and trade. Taking these names, however, as a whole, I think they support the inference that before 1365 A. D. the Malays had already colonised both coasts of the Peninsula. It is also pretty clear that at that date Singapore was still in existence and that Malacca had not yet been founded: for a list that enumerates Kĕlang, Sungai Ujong, Singapore and (probably) Muar would hardly have omitted Malacca, which lies between these places, if it had existed at that time. This string of names therefore once more confirms the amended chronology that I have suggested.

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(1) The legend has been put on record by Mr. D. F. A. Hervey in "Man" (1904), pp. 26 6; but at the moment of writing I am unable to refer to it for the purpose of seeing whether it throws any additional light on the origin of the name Sungai Ujong.

Without laying any particular stress on the fact. I think it is worth while drawing attention to the considerable gaps left by the Nāgarakrĕtāgama in its enumeration. The Encyclopædie points out the omission of Sĕnggora and Patani. It is equally noticeable that there is a complete blank between Kĕdah and Kĕlang: not a single place on the coast of Perak is mentioned. The same is true of the coast-line intervening between the Pahang river and Point Rumĕnia. It may be surmised that there were at that early date no settlements of any note along those two strips of coast.

## IV. Further Details from the Wu-Pei-Pi-Shu Charts.

A brief reference must be made to some additional almost contemporary evidence which serves to confirm that of the Nāgarakrĕtāgama in some points and to supplement it in others. For reasons which will presently be obvious I cannot pretend to do justice to this independent source, and I regret that I can only use it as a sort of appendix to what has already been said, instead of dealing with it as adequately as it deserves. The evidence in question is that of the Chinese charts appended to a Chinese work called the Wu-pei-pi-shu, by one She, Yung-t'oo. This work, it appears from two papers in Vol. XX., pp. 209-226 and Vol. XXI., pp. 30-42 of the Journal of the China Branch of the Royal Asiatic Society, is a relatively modern compilation but embodies much material taken straight out of considerably older books. Mr. G. Phillips, the author of the two papers just referred to, considers that the charts appended to it are older than the commencement of the fifteenth century. They are alleged to be the charts used by the Chinese captains who navigated the vessels conveying the celebrated Chinese envoy Chêng Ho (commonly called Sam-po) and his suite to the various southern and western countries which he visited. (This envoy, I may parenthetically observe, is recorded to have visited Malacca in 1409 A. D. The list of many other places which he visited in the course of his official career is given in an extract from the History of the Ming Dynasty by Mr. W. P. Groeneveldt in his valuable "Notes on the Malay Archipelago and Malacca," reprinted in "Miscellaneous Papers relating to Indo-China and the Indian Archipelago," 2nd Series, Vol. I., p. 170. He went as far afield as Magadoxu in East Africa).

Mr. G. Phillips has published facsimiles of these charts in the form of a long continuous strip, divided for convenience into two parts. The part relating to the regions to the eastward of Tenasserim appears in Vol. XXI., of the S. China Branch R.A.S. and is the one that concerns us here. It contains a great deal of geographical information in a much distorted shape. There is no approach to accuracy in its plotting of the outlines of the different countries set down in it. Thus the coast of the Malay Peninsula is laid down as an irregular line, following one almost uniform direction from right to left of the chart, all the way between Sĕnggora and Tenasserim. In fact it is plainly the record of an actual coasting voyage or voyages. Islands are marked in various places along the coast; and both on these and on many points of the coastline itself appear Chinese characters. Many of these characters represent in transcription the native names of places. Others appear to be Chinese descriptive names. A good many of these various place names have been identified by Mr. Phillips. But he appears to have omitted a certain number of others. His transliteration of the Chinese characters follows a dialect which is evidently not the one in which they were intended to be read and does not tend to facilitate identification. Probably too a good deal of additional light could be thrown on these names by some one possessed of local knowledge. I therefore venture to invite the attention of Chinese scholars in the Straits to these charts and suggest that they should bring their combined local knowledge and Chinese scholarship to bear upon them.

In the meantime Mr. Phillips' labours enable me to quote a certain number of place names recorded in this chart. Proceeding from right to left and starting at Sĕnggora 孫姑那 *Sun-ku-na,* we pass four groups of unexplained Chinese characters and then arrive at the Kĕlantan river 吉蘭丹港 *Keih-lan-tan-kiang.* Next on the coastline comes Trĕngganu 丁加下路 *Ting-kia-hia-lu,* then the Pahang river 彭坑港 *P'eng-keng-kiang,* then a place called 答那溪嶼(1) *Ta-na-ki-seu* which Mr. Phillips has not identified, and then 淡馬錫 *Tan-ma-seih,* which, as Colonel Gerini has rightly pointed out, is our old acquaintance Tumasik or Tĕmasek, otherwise Singapore. Curiously enough this is represented as being on the mainland, which shows that at this date the Chinese shipping already passed through the New Straits to the south of the island of Singapore, not through the Old Straits to the north of it.

Thus far we have been coasting along the east coast of the Peninsula. Dotted alongside of it in the chart, from a little to the right (i.e. north) of Kĕlantan onwards, are figured a number of named islands, some of which have been identified by Mr. Phillips, others not. Nearly opposite *Ta-na-ki-seu* the course laid down on the chart runs past an island marked 白礁 *Pei-chiao,* leaving it on the left or port side. This island Mr. Phillips identifies with Pedra Branca. The course then runs amongst a number of islands, leaving three to the right' (starboard, north) and four islands and a shoal, all named, to the left (port, south) side. (1) *Tan-ma-seih* is marked on the coast just opposite the second of the starboard islands. After passing the shoal to port, the course runs between Karimun 吉利門 *Keih-li-men*, which it likewise leaves to port, and Pulau Pisang 毗宋嶼 *Pi-sung-seu*, leaving the latter to starboard. This seems to me to clinch the Tumasik = Tĕmasek = Tan-ma-seih = Singapore equation absolutely. (2)

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(1) 嶼 = "island"

Of course the chart is not evidence that Singapore was still an inhabited settlement at the time when it was compiled. Maps and charts often contain names that are merely traditional: they are usually compilations embodying the notes and records of several generations of travellers and navigators. Besides, names often adhere to sites long after they have ceased to be inhabited. We shall see in a moment that this is probably the case in the present instance, for the next thing on the chart after Pulau Pisang (and wrongly put quite close to it) is an estuary in the coastline, on the further (right geographical) bank of which is a mountain or headland marked 身箭山 *Sia-ch'ien-shan,* presumably Tanjong Sagĕnting, Batu Pahat, as Mr. Phillips suggests. The course after leaving Pulau Pisang passes some half a dozen unnamed islands on the starboard side and then puts in at an inlet or river-mouth on the left geographical bank of which is the entry 滿剌加 which Mr. Phillips transcribes *Muan-la-kia,* adding that the Amoy pronunciation of the characters is *Moa-la-ka.* There is no sort of doubt that Malacca is intended: the same characters are uniformly used in the various Chinese sources translated by Groeneveldt. Probably if the other names in the chart were read with their Hokkien sounds it would make the whole thing more intelligible. On the right geographical bank of the same inlet is the entry 官廠 which Mr. Phillips has not explained.

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(1) The starboard islands, so far as I can make out, are marked (a) 官嶼 (b) 琵琶嶼 (c) 長腰嶼 the port islands (d) 馬革山 (e) 琶撓嶼 (f) 牛屎碼 (g) 涼傘嶼 (f) and (g) lie just opposite (below) (c). The shoal (h) 沙糖淺 lies just to the felt (west) of (g) and a bit further, on the south-west apparently, comes Karimun.

Mr. Phillips conjecturally identifies (c), which he transliterates *Chang-yaou-seu*, with Singapore island; but I think it represents some small island lying to the south of Singapore island. Perhaps it is Pulau Panjang: the Chinese name means "Long Waist Island."

(2) Cf. Pelliot, in Bulletin de l'Ecole Française d'Extrême Orient, 1904, Tome IV., p. 345 and Gerini, J. R A. S., July 1905, Part III., pp. 500-1. The first named paper is a long and learned dissertation in which a very large number of problems of historical geopraphy relating to South-Eastern Asia are exhaustively discussed. It teems with references to all manner of sources, Asiatic and European, and should be referred to by all who are interested in these questions.

I may add that the sailing directions inscribed on the chart rectify the rough drawing of the chart itself. They run in the opposite direction to that which I have been following, and go from Samudra viâ Malacca to China. I extract the following from Mr. Phillips' version of them: "Going from Malacca for five watches the vessel sights Sejin Ting and Batu Pahat river, three watches from which Pesang island is reached, and in five watches more Carimon is reached, five watches more S.E. by E. brings the vessel off Long Waist island (Singapore?) and into the Linga Straits, (1) through which for five watches on a course E. by a very little N. the White Rock, Pedra Branca, is reached." The course then proceeds in five more watches N.E. by N. to the eastward of Pulau Aor, and thence to Pulau "Condor" and so on past Cape St. James to China. It is plain that these sailing directions confirm the identifications already given.

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(1) This term is here improperly transferred from the Lingga Straits to the Straits of Singapore.

Continuing to follow the coast of the Peninsula as laid down in the chart, I find next after the inlet where Malacca is marked, a place called 假五嶼 *Kia-wu-seu*, which Mr. Phillips identifies as "Fisher's islet (?)". The Chinese name appears to mean "False Five Islands" but the characters are on the mainland itself. Remembering that "Five Islands" is an old Chinese name for Malacca, it may be conjectured that this entry refers to the neighbourhood of Port Dickson and Cape Rachado. Next, after coasting a considerable distance, is reached 綿花嶼 *Mien-hua-seu*, as it appears to read in Mr. Phillips' dialect (though he has not transliterated it), just near which in the sea is marked 緜花淺 *Mien-hua-chien*, which Mr. Phillips identifies as South Shoals. The names appear to be purely Chinese descriptions, not attempts to reproduce genuine native names. The second name appears in the midst of four or five small unnamed islands lying off the mouth of an inlet marked 吉令港 *Keih-ling-kiang*, "Kling river." I should like to read "Kĕlang river" if the Chinese characters allow of such a pronunciation, as to which question I express no opinion. Next, somewhat inland, is marked 吉那大山 *Keih-na-ta-shan*, unidentified. Then, but some distance further, we pass an island marked 九州 *Kiu-chou*, "Sambilangs," evidently the group of islands off the Perak coast known as Pulau Sĕmbilan, the Nine Islands: the Chinese name means the same thing as the Malay one. Next, but somewhat further out to sea, are put two islands close together, they second and larger of which is marked 陳公嶼 which name Mr. Phillips does not explain. These lie nearly opposite a wide river-mouth. A very little further on, but quite close to the mainland, lies

檳榔嶼 *Ping-lang-seu*, which (if these charts are really over 500 years old) is, I suppose, the first recorded mention of Pulau Pinang, commonly called Penang. On the same assumption, that they are the charts used for Chêng Ho's voyages, the above noticed mention of Malacca is also the first on record; for apart from these charts Malacca is first described in the account written by Ma Huan in 1416 A.D., this Ma Huan being a Chinese Muhammadan who had accompanied Chêng Ho as interpreter on his travels. Chêng Ho's first voyage was undertaken in 1405 A.D. and as it may be assumed that his ship-captains made use of the most up-to-date charts they could obtain, the mention of Malacca need not surprise us, for that town had then probably been in existence for 20 or 25 years. But of course we cannot be sure that the charts, even supposing them to be really old, have not been somewhat modified and brought up to date since Chêng Ho's time. My point is that whatever may be their actual date in their present shape, they undoubtedly embody some very ancient data, as the case of Tan-ma-seih sufficiently proves. Whether the entry referring to Penang goes back 500 years or not I leave as an open question, though I see no reason why it should not: the island is a very conspicuous object to mariners navigating along that coast.

Next after Penang island is a well-marked river-mouth in the coastline, lettered 吉達港 *Keih-ta-kiang*, that is to say the Kĕdah river, and a little further on an island marked 龍牙校椅 *Lung-ya-kiao-yi*, undoubtedly from its position representing the Langkawi islands though the Chinese name is much distorted from the original. Next comes an island bearing the five characters 古力由不洞 which Mr. Phillips does not explain, and here we appear to be pretty well at the limit of the Malay Peninsula proper, for the next place marked on the coastline bears the characters 獨掛頭山 (also unexplained: perhaps they represent Takua headland, if there is one?) and then, after passing two rivers and several unnamed islands, we reach Tenasserim, which lies outside my present sphere of interest.

### V. Prehistoric Speculations and Conjectures.

The evidence here put together gives, I think, an outline picture of what the Malay Peninsula was in the second half of the 14th. century, which though very sketchy is not altogether without interest to us moderns. One would like to peer further back into the dim past of this region and form some sort of idea as to when the process of Malay colonisation began. But unfortunately there is very little evidence to help us. Mr. Wilkinson hypothetically gives Singapore a very short lease of life, (from 1360 (?) to 1377 A. D., he suggests). That however is quite impossible: to have made the impression that it did on Malay legend and tradition, it must have lasted much longer and I see no reason why it should not have flourished during the reigns of five generations of kings, as the Sĕjarah Mĕlayu asserts. That would give it an existence of about a century as a Malay settlement, say from about 1280 A. D. to the time of its destruction about 1337 A. D. As a matter of fact there is some evidence that a settlement had existed upon this spot at an even earlier date: but we do not know that it was a Malay one and it may have been a Mon-Khmer colony. Crawfurd in his Descriptive Dictionary of the Indian Island, p. 402, records that among the ruins of the old Singapore (which amounted to very little when we acquired the place in 1819 A. D.) were found some Chinese coins the oldest of which bore the name of an emperor who died in 967 A. D. Unfortunately he omits to tell us what the dates of the remaining coins were and how many different specimens of Chinese coinage were represented in the find, although that information would have been very much to the point. Of course it is not safe to assume that there was a settlement at Singapore as early as the 10th. century simply because a Chinese coin of that period has ben found there. But on the facts it does seem probable that there was a trading station there considerably before the middle of the 13th century.

Colonel Gerini, in his article already referred to, has devoted a good deal of ingenious speculation and conjecture to the question of the antiquity of Singapore in pre-Malay times. But I fear that the conclusions he arrives at are merely hypothetical. They depend largely on suggested etymologies of local names which do not carry conviction. If, however, he is right (as I think he probably is) in his theory that there was once an old Mon-Khmer trading station on the island of Singapore, it is certain that it must have been abandoned somewhere about the middle of the 13th century (if not earlier). For at that period the Siamese became finally the masters of the whole Menam valley and a generation or so later Ligor, as well as Tenasserim and Tavoy, became tributary to the Siamese kingdom whose capital was at Sukhothai. *Colonel Gerini claims that about 1280 A. D. the Siamese conquered not merely Ligor but the whole of the Malay Peninsula. One can only say that up to the present there is no sufficient evidence to support such a claim. If they conquered it then, why did they let it go again a few generations later?

Although there seems to be no sufficient reason for believing that the Siamese ever subdued the whole of the Peninsula, there is evidence that at this period they came into conflict with the Malays. In the History of the Yuan dynasty there is an entry stating that in the first year of the period Yuan-Cheng (i.e. 1295) an embassy was sent by Siam to the court of China, on which occasion " as the Siamese had for a long time past been at war with the 麻里子兒 (Malays), both peoples submitted (i.e. to the majesty of China) and an Imperial order was issued to the Siamese saying: 'Do no hurt to the Malays, so that you may keep your promise'." This entry is quoted in Bowring's Kingdom and People of Siam, Vol. I, p. 71 and has

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*Gerini, Historical Retrospect of Junkceylon Island, in Journal of the Siam Society, 1905, p. 131.

been discussed by the late Professor Schlegel in T'oung Pao, Vol. IX, No. 4. *He thinks that it must refer to the Malays of the Peninsula: it does not seem likely that the Siamese could have had prolonged hostilities with Sumatra at this period. I think he is right as to that point and interpret the entry as recording the fact that when the Siamese, after asserting their supremacy over Ligor, pressed further southward into the northern parts of the Peninsula, they came into conflict with the Malays who had already at that time colonised the country. This would throw back the beginnings of regular Malay settlement in the Peninsula well into the middle of the 13th century, if not earlier, and I see no reason why that should not be so. At any rate it is quite certain that Mr. Wilkinson's 1400 A. D. is much too late. Malacca was not, in point of time, the first Malay settlement on the mainland; it rose rapidly to a position of predominance which overshadowed its older neighbours, but it by no neans marks the beginnings of Malay immigration into the Peninsula.

Here I must take leave of this subject. It may be convenient if I state briefly the general conclusions which the evidence here adduced appears to me to establish. They are as follows:—

(1) that the Malay colonisation of the Peninsula was already in progress in the 13th century;
(2) that Singapore, as a Malay settlement, was founded in that century (or possibly even earlier);
(3) that Singapore was still in existence throughout the first 60 or 70 years of the 14th. century and must have been conquered and destroyed by the Javanese of Majapahit shortly after 1377 A. D.
(4) that Malacca was not founded till some short time after 1377 A. D.
(5) that the reigning family of Malacca did not become converted to Muhammadanism until very near the end of the 14th century

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*Pelliot, loc. cit. p. 242, gives the same entry as well as a number of others' (p. 324 et seq.) mentioning the Malays. I have followed his version.

# From Central India to Polynesia:

## A New Linguistic Synthesis.

By C. O. Blagden.

In the undermentioned essay (¹) that indefatigable worker, Professor W. Schmidt, of Mödling, Austria, has taken another great stride along the line of research that he has marked out for himself and made peculiarly his own. In order to appreciate the nature and importance of his latest contribution, it is necessary to refer to the history of the problems he has been investigating. A quarter of a century ago the existence and extent of the principal language-families of Southern and South-Eastern Asia and the Indian Archipelago had been established in broad outlines. (²) But there remained a considerable number of forms of speech, some of them known only by name in those days, others already more or less adequately put on record and studied, which did not seem to fit into the accepted classification and had to be left, in little groups of doubtful coherence or even as isolated stragglers, outside the general scheme. This was the case in particular of the Kolarian (now renamed Munda) languages of Central India, of Khasi, of the Mon or Talaing language which is gradually dying out in Lower Burma, of Khmer or Cambojan, Annamese, and an endless string of dialects, some of them hardly known even now, in the inland parts of Indo-China, of the dialects of the Nicobar islanders, and those of the Sakai and Sĕmang of the Malay Peninsula.

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(1) Die Mon-Khmer-Völker, ein Bindeglied zwischen Völkern Zentralasiens und Austronesiens.—Archiv für Anthropologie, Neue Folge, Band V, Heft 1 und 2.—Braunschweig, 1906.

(2) R. N. Cust's "Sketch of the Modern Languages of the East Indies" may be referred to for particulars of what had been ascertained about that time.

It is true that long before the period referred to attempts had been made to include some of these unsorted items in the regular system of classification which comparative philology endeavours to achieve. Beginning more than half a century ago with Logan's suggestive but too speculative dissertations, it has pretty frequently been pointed out that there are some apparent points of resemblance, if not of connexion, between several of these linguistic derelicts. But as often as a connexion was asserted by one scholar it was denied by another; and as strict proof was not (and in most cases, owing to the inadequacy of the available evidence, could not be) offered, the matter remained unsettled. Of late years additional material for the study of most of these languages has been collected, making it possible to undertake a more systematic investigation into their peculiarities and mutual relations. On this latter task Professor Schmidt has been engaged for some time past. Starting with the conclusions arrived at by Kuhn in his valuable "Beiträge zur Sprachenkunde Hinterindiens," (3) that there is a common element running through these different languages but that it would be rash to group them all in one family, Professor Schmidt began in his monograph "Die Sprachen der Sakei und Semang auf Malakka und ihr Verhältnis zu den Mon-Khmer-Sprachen" (4) with an enquiry into the Sakai and Sĕmang dialects of the Malay Peninsula and their relations to the most ancient group of Southern Indo-Chinese languages.

This important paper was reviewed at some length in No. 39 of this Journal: it suffices to say here that it claimed to establish by strict proof a real genealogical relationship between these two groups of languages, the Southern Indo-Chinese and the Peninsular. In the year 1905 the learned author followed it up with two more studies in the same line of research. His

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(3) Sitzungsberichte d. K. Bayer. Akad. d. Wissensch., Phil.-hist. Kl., 1889, I, p. 219 seq.

(4) Bijdragen tot de Taal-, Land- en Volkenkunde van Nederlandsch-Indië. 6e Volgreeks, 8e Deel (Deel LII), 1901.

"Grundzüge einer Lautlehre der Mon-Khmer-Sprachen" (5) laid down for the first time the main lines of the comparative phonology of the Mon, Khmer, Stieng and Bahnar languages. Although perhaps subject to future modification in matters of detail, there can be no doubt that this work gives a new insight into the phonetic structure and past history of these tongues and is an acquisition of permanent value. In his "Grundzüge einer Lautlehre der Khasi-Sprache in ihren Beziehungen zu derjenigen der Mon-Khmer-Sprachen" (6) he goes on to show that Khasi, a language spoken in Assam, which had generally been regarded as standing quite alone, is really a distant relative (though not an actual member) of the Mon-Khmer group, and exhibits a similar structure, both phonetic and morphological. All these languages are in fact built up on the same system, viz. from very simple monosyllabic roots to which are added in many cases one or more prefixes or infixes. The same work also for the first time established the fact that the Palaung, Wa and Riang dialects of Upper Burma and the Shan States constitute a linguistic group standing midway between Khasi and the Mon-Khmer family, a fact which agrees remarkably well with the relative geographical position of these several groups.

In his most recent work on this subject Professor Schmidt points out that to this list of cognate languages must now be added the Nicobar dialects, which are not (as had previously been maintained) essentially polysyllabic but are built up just like all the others from monosyllabic roots. In the Nicobarese dialects, however, there is the important difference that not only prefixes and infixes but also suffixes are used in the structure of their words. This last fact is regarded by Professor Schmidt as a material piece of evidence in favour of grouping the Munda languages, which make a great use of suffixes, with the others already mentioned. Undeniably there is a considerable common element, as he shows, in the vocabularies of all these different groups of languages and also a good deal of similarity in the way they use their prefixes and infixes. Professor Schmidt claims, therefore, to have made out their common origin and connexion as a new family of languages, which he proposes to call the "Austroasiatic" family on account of the geographical position of its members, lying as they do scattered over the south-eastern corner of the Asiatic continent. This family is to include all the above mentioned languages, extending from Central India to the Malay Peninsula, inclusive.

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(5) Denkschrift d. K. Akad. d. Wiss., in Wien, Phil.-hist. Kl., Band III.

(6) Abhandl. d. K. Bayer. Akad. d. Wiss., Kl. 1, Band XXII Abt. III.

So far, this result may be said to embody and confirm conclusions the probability of which had already been tentatively foreshadowed by previous investigators. Professor Schmidt has accumulated fresh evidence in their favour and invested them with a much higher degree of probability. He now proceeds to take a further step, by connecting his "Austroasiatic" family of languages with the great Malayo-Polynesian family (as it has hitherto been called), to which Malay and the other languages of Indonesia, Polynesia and Melanesia (with the exception of the Papuan languages) belong. Thus, if this view be tenable, Sakai and Malay would after all be real, though very distant, relations, linguistically.

This is indeed a bold conception; but in order to appreciate the value of it, the evidence on which it rests must be considered and for that purpose the article itself must be consulted. No attempt can be made to reproduce its details here. Suffice it to say that in its main lines this conclusion is based on the recognised and generally accepted results of the comparative study of the Malayo-Polynesian languages and is an attempt to carry that line of investigation to its logical outcome. These languages in their present stage of development are (as is well known) made up of stem-words which are mostly of two syllables. There would seem therefore to be a fundamental difference between their structure and that of the "Austroasiatic" tongues with their monosyllabic roots. But research into the Malayo-Polynesian languages has shown that in very many cases their stem-words have been built up from earlier monosyllables. This has usually, as in the "Austroasiatic" languages, been done by means of some prefix, and it is therefore as a rule the last syllable of a Malayo-Polynesian stem-word that represents the original root. But sometimes an infix and occasionally a suffix appears to have been used. Professor Schmidt's view is that the Malayo-Polynesian roots were originally *all* monosyllabic and that the modern stem-words of two syllables with which we are familiar have been formed from the original roots by the agglutination of formative elements. These last, he conceives, once had a more or less definite function in the way of differentiating the meaning of the root, but have now become quite fossilised and being no longer separable from the root are regarded as an essential part of the word. Thus it is that the Malayo-Polynesian languages possess very few monosyllabic words but a very large proportion of words of two syllables.

If this view of the structure of the Malayo-Polynesian languages is correct' (and it is certainly consistent with the results of the study of those languages by several independent scholars of great authority), clearly a great step has been taken towards bridging the apparent gulf between them and the "Austroasiatic" family. It must further be observed that on this old fossilised structure the Malayo-Polynesian tongues have superimposed a newer system of formatives which serve the purpose of differentiating grammatical functions. Thus they deal with their stem-words in much the same way as they are supposed to have dealt' (and the "Austrosiatic" languages are known to have dealt) with the original monosyllabic root-words. There is a considerable amount of analogy between these different families of speech in the use and even in the form of the prefixes and infixes which they respectively employ. The most striking cases, perhaps, are the prefix *pa*-, which in the Mon-Khmer languages, Nicobarese and the Malayo-Polynesian family forms causatives, and the infixes -*n*- and -*m*- which, with somewhat varying functions, are found in a good many of these different languages. There are other points of grammatical analogy enumerated in Professor Schmidt's article: but they are somewhat less cogent and it would take up too much space to discuss them here. Finally, in an appendix he gives over 200 groups of words in which in his opinion a comparison between the "Austroasiatic" and the Malayo-Polynesian' (or, as he proposes to style them, "Austronesian") forms shows an identity of root.

With regard to these verbal comparisons, I must say that while some of them are not at first sight very convincing, yet there is a considerable proportion where the analogy is so striking that one can hardly attribute it to mere chance coincidence. In compiling the comparative vocabulary of aboriginal dialects contained in "Pagan Races of the Malay Peninsula" I was often struck by the curious analogies presented by Malay words on the one hand and Mon-Khmer words on the other, so that in some cases it seemed impossible to decide with which set of languages a given aboriginal word was most closely connected. In No. 38 of this Journal I had ventured tentatively to account for the occurrence of similar words in Malayan languages and Mon and Khmer by the suggestion that they might be ancient Malayan loanwords in the Mon-Khmer languages, derived by them from the now extinct Malayan dialects of Southern Indo-China. That such loanwords do exist there can be no doubt; but I now see that this explanation is quite inadequate. It cannot account for the large number of analogies pointed out by Professor Schmidt in his last paper, especially now that Khasi and Muṇḍa have been brought into the comparison. For here, surely, Malayan influence is quite excluded. Thus the Bahnar word *tölĕy*, "rope", might well be suspected of being a mere Malayan loanword (from the Cham *lalei*); but when we find *tyllai* in Khasi, we no longer feel able to account for the latter form in this way and may even have our doubts about the Bahnar word. On the other hand Professor Schmidt concedes that the Bahnar *dönau*, "lake", may well be a loanword from the Malayo-Polynesian languages: he has not succeeded in finding it in other Mon-Khmer languages. I may suggest that it comes from the Cham *danau*.

I think there can be no objection to my giving a small selection from the 215 instances in Professor Schmidt's appendix. In the following cases there seems to be really no doubt that the roots are identical (I give extracts only): No. 6 Malay *rĕkat* (to which I think should be added *lĕkat* and *ikat*) = Bahnar *kăt*, *köt*, "to bind", Mon *dakat*, "to knot"; No. 7 Malay, etc. *takut* = Khmer *kot*, Mon *taküt*, "to fear"; No. 182 Malay *tĕlūt* = Khmer *lut*, "to bend (the knee)", Bahnar *lot*, "to enter in a bowed attitude"; No. 183 Malay *tĕlan*, etc. = Bahnar *lūön*, Stieng *luôn*, "to swallow." There are a good many more that could be quoted. On the other hand some of the comparisons seem to me exceedingly dubious. Even when the correspondence in form is to all appearance very close, it often happens that the connexion in meaning strikes one as being uncommonly far-fetched. There seems to be here a gap in the method of such investigations. What we want to guide us through the mazes of derived and cognate words, is a science of the relations of the secondary meanings of words to their primary ones. I believe that the groundwork of such a science has already been laid down for some of the better known families of language. But it is clear that its lines must be retracted for all the different cultural strata of mankind. What strikes the savage in one way would probably strike the more civilised man in quite another fashion. It requires a really intimate acquaintance with the primitive mind to be able to produce its processes with any approach to certainty.

In many cases the etymologies suggested by Professor Schmidt are nothing more or less than highly ingenious guesses. Thus, for example, he sees in the Malay *dukut*, "grass," (which does not occur in Wilkinson's Dictionary and is perhaps a Javanese loanword) a root meaning "green," for which however the only authority given is the Stieng *kŭt*, "green." Malay *akar*, "root," etc., is similary traced to the Bahnar *kor*, "to go down to the ground." Malay *pandan*, "pandanus," is connected with the idea of sweetness: I believe the juice of its fruit gives a drinkable liquor, but is it particularly sweet? Malay *landak*, "porcupine", again, is explained as the animal which "rolls itself up:" one knows that hedgehogs roll themselves into a ball when attacked, but I am not enough of a naturalist to be sure that porcupines do the like, though it seem probable. The connexion between the ideas of " spreading out" (Malay *hampar*) and "flying" (Mon-Khmer *par*) seems to me highly conjectural; nor can it be said to be much assisted by the Mon *gapaw-ā*, " to go around."

In one or two instances we find an unfortunate diversity of opinion among our authorities in Malayo-Ploynesian etymology. Thus according to Dr. Brandstetter the Malay word *tĕlinga*, "ear," contains a root *ling*, identical with *ding*, which in its variant form *dĕng* also occurs in Malay *dĕngar*, and which he interprets as meaning "to hear." Professor Schmidt on the other hand takes the word *tĕlinga*, to be derived from a root *ling* (found in *tĕliling*, etc.) meaning "to turn," " to return," " round," and connects the word with the shape of the external human ear, not with the function of the internal part of the organ. Who can say which is right? True, Professor Schmidt gives a similar etymology for the Malay *kuping*, which also means " ear;" but there is no more certainty in this derivation than in the other. In fact there is less: for the parallels quoted mean not " to wind, " as he would have it, but " to bind," "to plait" and "to weave." It seems to me that we want something more than mere conjecture to bridge the gap between these conceptions and the idea of the human (or animal?) ear. Again in the word *rambut*, "hair," Professor Schmidt finds a root *but*, "to roll," to, twist," "to fall." This does not seem very apposite, but he gets over the difficulty by explaining that *rambut*, means "that which is matted." The majority of modern Indonesians have lank hair which does not form itself into a mat or mop even when allowed to grow to its natural length. If the explanation is correct, we have here a very valuable piece of prehistoric anthropological information, namely that part of the ancestry of the very mixed modern Indonesian from which he derives the essentials of his language did not have lank but wavy or possibly even curly hair. Unfortunately Dr. Brandstetter quite independently and without any reference to the above suggested etymology points out that the words for " hair " in the Indonesian languages display four variants of one root, viz. *buk*, *but*, *bul*, and the simpler form *bu*. That these are all in some way connected with one another is as good as certain: there are too many similar cases in these languages to admit of our attributing such resemblances to mere accidental coincidence. But how they are connected is a problem that still awaits a solution and until that question is satisfactorily answered Professor Schmidt's derivation is at any rate premature: it is no use accounting for *but* and leaving its three poor relations out in the cold.

There are one or two other minor points, not essential to the main argument of the paper, on which I feel compelled to differ from the author. While agreeing with him that Bĕsisi has a closer relation to the Mon-Khmer languages than Sĕnoi or Tĕmbe' have, I cannot admit that the same proposition holds good of the Jakun dialects. Whatever may be their origin, it seems to me that the Jakun dialects are very remote from the Mon-Khmer family. Further I think his suggestion that Sĕnoi represents a mixture between Sĕmang and Bĕsisi is quite unarguable: what these three have in common is the element allied to Mon-Khmer and this is very often more archaic in Sĕnoi than in the other two groups. Again I think that his view that the words *jung*, "foot," *sĕlak*, "leaf," and *dak*, "water" are Aryan loanwords imported into the Further Indian languages' (including the aboriginal dialects of the Peninsula) at a remote date when the linguistic ancestry of the tribes that use them were in contact with Aryan races, is an arbitrary assumption. It is based on a resemblance with certain Sanskrit words, which resemblance may after all be purely fortuitous in these three cases. One of the arguments by which Professor Schmidt supports his contention is that these words do not appear in Sĕmang. As a matter of fact there is conclusive evidence that the word for "leaf" does occur in the Sĕmang dialects. But anyhow it seems highly improbable that the native terms for such ordinary everyday objects as "foot," "leaf," and "water" should in such a very large number of allied languages have been replaced by Aryan equivalents.

In another part of his paper Professor Schmidt seeks to show that the great linguistic synthesis which he propounds and in support of which he has brought forward such weighty arguments is balanced by a fundamental unity of race among the peoples that speak these various allied languages. I venture to think that this view must be received with much caution. Whether or not there is a thin strain of common blood running through these very diverse races is a point that does not and cannot affect the classification of their languages. Personally I rather regret that the attempt has been made to establish even a qualified racial unity such as this amongst populations which differ physically amongst themselves as much as chalk does from cheese. Not only is it in my judgment premature inasmuch as the data available are quite inadequate to support the conclusion, but it is liable to do harm by casting doubt on the validity of the purely linguistic inferences, where the evidence is far more perfect. Everyone remembers the absurd inferences which were formerly drawn from the existence of the Indo-European family of languages: how we were gravely told that the same blood courses in the veins of the Bengali and the Icelander, and so forth, merely because their languages are ultimately derived from a common source. There is a similar danger in the present case. We must not let linguistic relationships blind us to anthropological differences. It is important to remember that such differences are deepseated and that the new family of languages recognised by Professor Schmidt (assuming its existence as proved) under the name of the "Austric" family is spoken by races as different from one another as those which speak the Indo-European languages. Some are Mongoloid in physical type, others approximate more towards the Caucasian form (which of course by no means implies any real relationship with the Caucasian race, commonly so called); some are practically indistinguishable from Dravidians in physique, others again are Negritos of a fairly pure kind, and many are Oriental Negroes indistinguishable from their cousins who speak the quite alien Papuan languages. Professor Schmidt is far too intimately acquainted with the intricacies of his subject to be unaware of these differences and the difficulties to which some of them give rise. What I complain of is that he has not drawn attention to the existence of these complicated problems with sufficient distinctness, so as to warn those who do not know as much about the matter as he does himself. He is inclined, in support of his unifying scheme, to glide quietly over the difficulties that still remain unexplained.

I cannot here go into the other points raised in this interesting and valuable paper, but must refer anyone who wants more information to the original itself or to the French translation which has recently appeared in the Bulletin de l'Ecole Française d'Extrême Orient, Tome VII., Nos. 3 & 4, under the title "Les peuples Mon-Khmêr, trait d'union entre les peuples de l'Asie centrale et de l'Austronésie." Whether its conclusions be accepted in their entirety or not, there can be no doubt that it is an epochmaking and most important contribution to philological science.

# Fruit of Burbidgea.

The dispersal of seed in the order *Scitamineae* seems to be nearly always affected by the aid of animals. Thus in the *Catimbium* section of *Alpinia* we find the globose capsule often of a bright orange color. It partly dehisces and discloses the small hard aromatic seed, enclosed in a sweet white aril, popular with many animals and birds. In the smaller *Alpinias* of the *Hellenia* section, the whole fruit is pulpy, red or black, a berry in fact attractive to birds.

In the epiphytic and also in some at least of the terrestrial *Hedychiums*, the capsule which is of a bright orange color dehisces and the valves spreading disclose the seed wrapped in a brilliant read pulpy aril. The *Amomums* and other *Scitamineae* with radical inflorescence, have usually dull colored, green or brownish fruit, borne on the short peduncles close to the ground occasionally the fruit is brilliantly colored red, and ornamented with processes of various forms, and these appear to be chiefly dispersed by rats or other small terrestrial mammals. *Phaeomeria* (*Nicolaia)* has its fruits borne in a close set head on the top of the stout peduncle usually about two feet tall. In most species the fruit are dull green or brown, though in *N. venusta* they are bright red and conspicuous, but in all cases squirrels or rats seem to be the dispersers of the seed, gnawing the pericarp and scattering the seed to some distance.

In *Burbidgea* we have an entirely different system, the seeds being adapted for wind dispersal, and it is the only case of such modification known to me in the order.

*Burbidgea* is a genus peculiar to Borneo, apparently always terrestrial, with stems of about 2 feet or less in height, which bear a raceme of red flowers resembling those of a *Hedychium*. The capsules are cylindric, 1½ inches long and ⅛ inch through, pubescent, at first green then becoming brown, the pericarp thin and papery. When ripe the capsule splits for its whole length along one side. The placenta remains attached by both ends and from it are suspended the very small light seeds attached by a funicle 1mm long. The seeds are 3mm long and 1mm in diameter, cylindric with a short sharp terminal mucro, they are brown and smooth. From the base of each rises a thin papery white aril irregularly cut into laciniae, some of which are nearly as long as the seed. The seeds hang downwards from the placenta waving with every puff of wind, and seem to be easily blown to a distance. They are very light and float on water. The aril is very thin and inconspicuous so that it is hardly likely to be attractive to any animal, and from the curious way in which the seeds are suspended, their lightness and the ease with which they are detached and blown away, there seems no doubt that the whole fruit has been modified from that of an ordinary animal-dispersal form, for dispersal by wind.

There are two species of *Burbidgea* known, viz *B. nitida* and *B. schizocheila*. It is from a plant of the latter which I received from Mr. J. Hewitt and cultivated in the Botanic Gardens, Singapore, that I make these observations. I have however also a wild spray of fruits sent by the same collector.

H. N. RIDLEY.

## Malacca Harbour.

With respect to the paper under the above title in Vol. 52, p. 111, reprinted from the Singapore Free Press of 1884, we have received a letter from Mr. D. F. A. Hervey, stating that he was the author of the original article.

ED.

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# STRAITS BRANCH
# ROYAL ASIATIC SOCIETY

[No. 54]

# JOURNAL

January, 1910.

230986

Agents of the Society

London: Kegan Paul, Trench, Trübner & Co.

PRINTED AT THE METHODIST PUBLISHING HOUSE SINGAPORE

[No. 54]

# JOURNAL

of the

# Straits Branch

of the

# Royal Asiatic Society

## JANUARY, 1910

230986
National

SINGAPORE:
PRINTED AT THE METHODIST PUBLISHING HOUSE
1910.

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# THE
# STRAITS BRANCH
# OF THE
# ROYAL ASIATIC SOCIETY.

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## COUNCIL FOR 1910.

| | | |
|---|---|---|
| Hon. Dr D. J. Galloway, | President. | |
| Mr. C. J. Saunders, | Vice-President for | Singapore. |
| Hon. A. R. Adams, | ,, | Penang. |
| Mr. W. D. Barnes, | ,, | Federated Malay States. |
| Mr. H. N. Ridley, | Honorary Secretary. | |
| Dr. Hanitsch, | Honorary Treasurer. | |
| Mr. W. Makepeace, | Honorary Librarian. | |
| Mr. V. A. Flower, | Councillors. | |
| Mr. A. Knight, | | |
| Rev W. Drury, | | |
| Mr A. T. Bryant, | | |

# PROCEEDINGS

of the

# Annual General Meeting.

The Annual General meeting was held on Feb. 7, 1910.

*Present :—*

Dr. Galloway (President)

Mr. W. Makepeace.
Mrs. Sanderson.
Rev. W. Drury.
Mr. Bean.
Mr. R. Little.

Mr. A. Knight.
,, V. A. Flower.
,, D. T. Boyd.
,, Spakler.
,, A. D. Machado.

Dr. Hanitsch.

The Annual Report of the Council was laid upon the table, Dr. Galloway proposed its adoption which was seconded by Mr. Knight and carried.

The Treasurer's account was submitted and Dr. Galloway proposed and Mr. Makepeace seconded its acceptance, which was carried.

The officers for the ensuing year were then elected as follows.

| | |
|---|---|
| *President* ... ... ... | DR. GALLOWAY. |
| *Vice President for Singapore* ... | MR. C. J. SAUNDERS. |
| ,, *Penang* ... | ,, A. R. ADAMS. |
| ,, *Federated Malay States* | W. D. BARNES. |
| *Hon. Secretary* ... ... | H. N. RIDLEY. |
| *Hon. Treasurer* ... ... | DR. HANITSCH. |
| *Hon. Librarian* ... ... | W. MAKEPEACE. |
| *Councillors* ... ... ... | MR. V. A. FLOWER.<br>MR. A. KNIGHT.<br>REV. W. DRURY.<br>MR. A. T. BRYANT. |

The following new members were then elected.

MR. T. C. MILLER.
,, CLIFFORD S. BRISON.
,, P. S. FALSHAW.
,, H. C. PAXON.
,, H. BERKELEY.
,, MONEY.

Mrs. Sanderson proposed that the Council be asked to arrange a series of lectures and demonstrations on various subjects of interest by members of the Society, which was agreed to.

Mr. W. Makepeace proposed a vote of thanks to the President for presiding at that and previous meetings.

# List of Members for 1910.

* Life Members. † Honorary Members.

Patron: H. E. Sir John Anderson, G.C.M.G.

| | |
|---|---|
| Abbott, Dr. W. L. | Singapore. |
| Acton, R. D. | Penang. |
| Adam, Frank | Singapore. |
| Adams, Hon. A. R. | Penang. |
| Adams, T. S. | Perak. |
| Aldworth, J. R. O. | Kuala Lumpor. |
| Allen, Rowland | Singapore. |
| Anderson, E. | Singapore. |
| Anthonisz, Hon. J. O. | Singapore. |
| Arthur, J. S. W. | Singapore. |
| Asmus, Ad. | Singapore. |
| Avetoom, Dr. T. C. | Penang. |
| Ayre, C. F. C. | Singapore. |

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| *Banks, J. E. | Iowa, U. S. A. |
| Barker, Dr. A. J. G. | Sarawak. |
| *Barnes, W. D. | Pekan, Pahang. |
| Bartlett, R. J. | Malacca. |
| Bean, A. W. | Singapore. |
| Beatty, D. | Singapore. |
| Benjafield, F. J. | Singapore. |
| *Berkeley. H. | Taipeng, Perak. |
| Bicknell, W. A. | Penang. |
| Bidwell, R. A. J. | Singapore. |
| Birch, Hon. E. W., C.M.G. | Perak. |
| Bishop, Capt. C. F. | Europe. |
| Bishop, J. E. | Klang, Selangor. |

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| *Blagden, C. O., M.A. | Davos, Switzerland. |
| Bland, Hon. R. N. | Penang. |
| Bland, Mrs. R. N. | Penang. |
| Boyd, D. T. | Singapore. |
| Brison, Clifford S., | Singapore. |
| Brockman, E. L., C.M.G. | Seremban, N. Sembilan. |
| Brooks, C. J. | Bau, Sarawak. |
| Brown, A. V. | Penang. |
| Brown, D. A. M. | Penang. |
| Bryant, A. T. | Singapore. |
| Buckley, C. B. | Singapore. |
| Burgess, P. J. | England. |
| Burn-Murdoch, A. M. | Kuala Lumpor. |

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| Campbell, J. W. | Kuala Lumpor. |
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| Carver, C. I. | Singapore. |
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| Chancellor, A. R. | Singapore. |
| Chapman, W. T. | Taipeng, Perak. |
| Coghlan, H. L. | Singapore. |
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| Cook, W. W. | Singapore. |
| Croucher, Dr. F. B. | Penang. |
| Cuscaden, G. P. | Seremban, N. Sembilan. |

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| Dallas, Hon. F. H. | Sarawak. |
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| Dent, Dr. F. | Singapore. |
| *Deshon, Hon. H. F. | England. |
| Dew, A. T. | England. |
| Dew, E. Costa | Negri Sembilan. |

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| Flower, V. A. | Singapore. |
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| Hinks, Capt. T. C. | England. |
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| Hose, R. E. | Busau, Sarawak. |
| Hoynck, van Papendrecht, P. C. | Brussels. |
| Hubback, T. R. | Negri Sembilan. |
| Hughes, J. W. W. | Negri Sembilan. |
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| Kinsey, W. E. | Negri Sembilan. |
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| Kloss, C. B. | Taipeng, Perak. |
| Knight, Arthur | Singapore. |
| Knocker, F. W. | Europe. |
| Kriekenbeek, J. W. | Perak. |
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| Lemon, A. H. | Singapore. |
| Lermit, A. W. | Singapore. |
| Lewis, J. E. A. | Kuching, Sarawak. |
| Lim Boon Keng, Dr. | Singapore. |
| Little, R. | Singapore. |
| Lloyd, J. T. | Singapore. |
| Low, H. A. | Singapore. |
| Luering, Rev. Dr. H. L. E. | Frankfurt o/M. |
| Lupton, Harry | Malacca. |
| Lyons, Rev. E. S. | Dagupan, Philippine I. |
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| MacArthur, S. H. | Kuala Lumpor. |
| McCausland, C. F. | Perak. |
| MacDougall, Dr. W. | Singapore. |
| Macfadyen, E., | Jugra, Selangor. |
| Machado, A. D. | Singapore. |
| Mackray, W. H. | Klang, Selangor. |
| Maclaren, J. W. B. | Europe. |
| Mahomed, bin Mahbob, Hon. Dato | Johore. |
| Main, T. W. | Singapore. |
| Makepeace, W. | Singapore. |
| *Marriner, J. T. | Kelantan. |

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| Marsh, F. E. | Singapore. |
| Marshall, F. C. | Raub, Pahang. |
| Marshall, Harold B. | Brunei. |
| Mason, J. S. | Kelantan. |
| Mauldon, E. F. | Singapore. |
| Maxwell, Eric | Ipoh, Perak. |
| Maxwell, W. G. | Kedah. |
| May, C. G. | Penang. |
| Millard, Dr. A. S. | Taipeng, Perak. |
| Millard, H. | Singapore. |
| Money, A. W Kyrle. | Singapore. |
| Moorhouse, Sydney | Malacca. |
| Miller, Mrs. T. C. B. | Singapore. |
| Mouat, J. | Kuantan, Pahang. |
| Moulton, J. C. | Sarawak. |

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| Napier, Sir W. J., D.C.L., K.B. | England. |
| Nathan, J. E. | Penang. |
| Norman, Henry | Selangor. |
| Nunn, B. | Penang. |

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| Parr, C. W. C. | Klang, Selangor. |
| Paxon, H. C. | Singapore. |
| Peacock, W. | Singapore. |
| Pears, Francis | Muar. |
| Peirce, R. | Singapore. |
| †Perham, Ven. Archdeacon A | England. |
| Plumpton, M. E. | Singapore. |
| Pra, C. Da | Negri Sembilan. |
| Pringle, R. D. | Singapore. |
| Pykett, Rev. G. F. | Penang. |

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| Rankin, H. F. | Amoy. |
| Reid, Alex | Singapore. |
| Reid, Dr. Alfred | Kuantan, Pahang. |
| Rennie, J. S. M. | Singapore. |
| Richards, D. S, | Negri Sembilan, |

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|---|---|
| Ridley, H. N., M.A., F.R.S. | Singapore. |
| Rigby, J. | Perak. |
| Robinson, H. C. | Kuala Lumpor. |
| Rostados, E. | Singapore. |
| Rowland, W. R. | Negri Sembilan. |

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| St. Clair, W. G. | Singapore. |
| Sanderson, Mrs. Reginald | Singapore. |
| †Sarawak, H. H. Rajah of, G.C.M.G | Sarawak. |
| †Satow, Sir E. M., K.C.M.G. | England. |
| Saunders, C. J. | Singapore. |
| Schudel, G. | Singapore. |
| Schwabe, E. M. | Kajang, Selangor. |
| Scott, R. | Malacca. |
| Scrivenor, J. B. | Batu Gajah, Perak. |
| Seah Liang Seah. | Singapore. |
| Seah Song Seah. | Singapore. |
| Shelford, R. | Oxford. |
| Shelford, W. H. | London. |
| Shellabear, Rev. W. G. | Malacca. |
| Sims, W. A. | Singapore. |
| Sinclair, J. M. | Singapore. |
| Skinner, Capt. R. McK. | Singapore. |
| †Smith, Sir Cecil C., G.C.M.G. | England. |
| Song Ong Siang | Singapore. |
| Spakler, H. | Singapore. |
| Steedman, R. S. | Intan, Upper Perak. |
| Stevens, K. A. | Singapore. |
| Still, A. W. | Singapore. |
| Stoney, B. O. | Brunei. |

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|---|---|
| Tan Cheng Lock | Malacca. |
| Tan Jiak Kim, Hon. | Singapore. |
| Tatlock, J. H. | Perak. |
| Thunder, M. | Singapore. |
| Twiss, F. R. | Pahang. |

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|---|---|
| Van Benningen von Helsdingen, Dr. R. | Tanjong Pandan, Billiton. |
| Walker, Lt.-Col. R. S. F., c.m.g. | Taipeng, Perak. |
| Ward, A. B. | Sarawak. |
| Watkins, A. J. W. | Singapore. |
| Weld, F. J. | Kuala Lumpor. |
| Welham, H. | Penang. |
| Wellington, Dr. A. R. | Singapore. |
| West, Rev. B. F., m.d. | Washington, U. S. A. |
| Whitehead, C. B. | Singapore. |
| Williams, J. H. | Singapore. |
| Williams, S. G. | Singapore. |
| *Winkelmann, H. | Singapore. |
| Winstedt, R. O. | Perak. |
| Wolff, E. C. H, | Kuala Lumpor. |
| *Wood, E. G. | Kuala Kangsar. |
| *Young, H. S. | Bau, Sarawak. |

# Annual Report of the Council for the Year 1909.

The Council for the year consisted of the following:—

Dr. D. J. Galloway, *President.*
Hon. W. D. Barnes, *Vice-President for Singapore.*
Hon. R. N. Bland, *Vice-President for Penang.*
Mr. H. C. Robinson, *Vice-President for Federated Malay States.*

Mr. H. N. Ridley, *Honorary Secretary.*
Mr. R. J. Bartlett, *Honorary Treasurer.*
Mr. W. Makepeace, *Honorary Librarian.*

| | |
|---|---|
| Rev. W. Drury,<br>Dr. Hanitsch,<br>Mr. V. A. Flower,<br>Mr. A. Knight, | *Councillors.* |

Towards the end of the year Dr. Hanitsch acted as Treasurer in the absence of Mr. Bartlett.

The Council are pleased to be able to report a satisfactory progress in the affairs of the Society.

No less than forty-six new members joined the Society during the year, this being the largest number of new members added to the society in any year since the foundation.

The names of the new members are as follows;—

Mrs. R. Sanderson
Mr. S. G. Williams
,, R. R. Goulding
,, T. S. Adams
,, H. B. Marshall
,, A. B. Ward
,, C. W. Banks
,, C. I. Carver
Hon. E. C. Ellis
Mr. R. Little
,, Rowland Allen
,, A. W. Bean
,, H. L. Coghlan
,, W. G. Hennings
,, F. E. Marsh
,, J. C. Moulton
,, G. P. Cuscaden
Dr. A. S. Millard
Mr. J. R. Hubback
Capt. A. McK. Skinner
Mr. C. G. May
,, C. J. Brooks
,, R. Peirce
Mr. A. G. Harrington
,, W. L. Kemp
,, H. A. Low
Hon. C. McArthur
Mr. E. F. Mauldon
,, M. E. Plumpton
,, J. S. M. Rennie
,, W. A. Sims
,, M. S. H. McArthur
,, J. E. Nathan
,, A. V. Brown
,, J. C. Ferrier
,, A. Y. Gahagan
,, R. J. Farrer
Dr. Keith
Mr. J. W. Hughes
,, D. S. Richards
Lieut. C. H. Gay
Mr. M. Thunder
,, J. Mouat
Rev. W. Drury
Dr. Glennie
Mr. W. Peacock

A circular detailing the scope and work of the Society was printed for distribution to persons resident in the peninsula and neighbourhood who have not become members of the Society. It was considered probable that many would be glad to join if they knew the advantages to be obtained from membership.

Three volumes of the Journal, viz: 51, 52 and 53, were published during the year and another will shortly be issued. The number of contributors has much increased and many valuable and interesting papers are being obtained by the Society.

An Index (Vol. 51) to the fifty volumes already published drawn up by Mr. Barnes has been printed and distributed to members.

As there were a very large number of copies of the previously published volumes in stock, it was decided to offer them to members at a reduced rate.

A new edition of the Map of the Malay Peninsula was completed and the sheets were sent home to Messrs. Stanford for printing and it is hoped it may be ready for distribution early this year.

The Library was arranged by the Librarian and a catalogue of its contents prepared for the press and rules for the use of the library were drawn up.

A considerable number of journals and pamphlets were received from other institutions in exchange and were incorporated with the Library.

The Treasurer's account is appended.

# HONORARY TREASURER'S ACCOUNT FOR THE YEAR 1909.

| | $ | c. | $ | c. | | $ | c. | $ | c |
|---|---|---|---|---|---|---|---|---|---|
| Balance brought forward from 1908:— | | | | | Payments in 1909:— | | | | |
| Mercantile Bank, Fixed Deposit ... ... | 2700 | .. | | | Methodist Publishing House, Journal 50 ... | 268 | 20 | | |
| Chartered Bank, Fixed Deposit ... ... | 2300 | ... | | | 51 ... | 181 | 18 | | |
| Mercantile Bank, Current Account ... ... | 183 | 05 | | | 52 ... | 335 | 22 | | |
| Chartered Bank, Current Account ... ... | 12 | 36 | | | 53 ... | 200 | — | | |
| Cash in Hand ... | 5 | ... | | | (leaving $151 10) | | | | |
| | | | 5200 | 41 | Catalogue, Printing of ... | 81 | 75 | | |
| | | | | | C. Hentschel, illustrations... | 18 | 07 | | |
| Receipts in 1909:— | | | | | Preparing Catalogue, (second payment)... | 100 | — | | |
| Subscriptions for 1903 ... | 5 | ... | | | Bookbinding ... | 32 | 50 | | |
| ,, ,, 1904 ... | 10 | ... | | | Carpenter ... | 189 | — | | |
| ,, ,, 1905 ... | 10 | ... | | | Clerk's Salary, Jan.-Nov.... | 205 | — | | |
| ,, ,, 1906 ... | 15 | ... | | | Peon's Salary, Jan.-Nov. ... | 22 | — | | |
| ,, ,, 1907 .. | 55 | ... | | | Petties (postages, &c.) ... | 80 | 26 | 1713 | 18 |
| ,, ,, 1908 ... | 165 | ... | | | Balance carried forward:— | | | | |
| ,, ,, 1909 ... | 760 | ... | | | Mercantile Bank, Fixed Deposit ... ... | 2700 | — | | |
| ,, ,, 1910 ... | 45 | ... | | | Chartered Bank, Fixed Deposit ... ... | 2300 | — | | |
| ,, ,, 1911 .. | 5 | .. | | | Mercantile Bank, Current Account ... ... | 19 | 15 | | |
| Sale of Journals .. | 289 | 28 | | | Chartered Bank, Current Account ... ... | 47 | 86 | 5067 | 01 |
| Sale of B. N. B. Gazette | 20 | ... | | | | | | | |
| Bank Interest, Fixed Deposits ... ... | 200 | 50 | 1579 | 78 | | | | | |
| | | | 6780 | 19 | | | | 6780 | 19 |

Audited and found correct,

A. KNIGHT.

R. HANITSCH,

*Honorary Treasurer, Straits Branch, Royal Asiatic Society.*

# New or Rare Malayan Plants.
# Series V.

By H. N. Ridley, F.R.S., F.L.S.

In going over the herbarium at the Botanic Gardens, Singapore, I find a good many plants not recorded in the Materials of the Flora of the Malay Peninsula, some overlooked, others collected since the publication of the earlier numbers. I have therefore put together notes and descriptions of these plants so that they may be on record. A few orchids too received from Sarawak from Mr. Hewitt and others are also described.

Since Sir George King described the *Dipterocarpeae* several new ones were described by Sir D. Brandis, and I have given notes on these, rather fuller than in other cases as these trees are of considerable importance to foresters, on account of the value of their timbers. Curiously among the Dipterocarps omitted from the Materials by Dr. King is the well-known Camphor tree, *Dryobalanops camphora* of which I hope to give a full account when I have got certain further information about it.

## DILLENIACEAE.

### Wormia.

The shrubs and trees of the genus *Wormia* are among the most striking of our local plants, the brilliant colouring of the large yellow, more rarely white flowers, being most conspicuous. The genus is closely allied to the equally showy one *Dillenia,* but is I think very distinct. King in the Materials for a flora of the Malay Peninsula distinguishes the two genera correctly by the absence of an aril in the *Dillenias* and the presence of an aril in the *Wormias.* Martelli in Malesia has mixed the two genera together under the name

*Dillenia,* and has by no means made this group of plants easier to understand. The real difficulties of separating the two genera lies only in the difficulty of working from badly preserved herbarium specimens. The plants undoubtedly do not, unless very carefully preserved, dry well, but in life there is little difficulty in distinguishing the two genera. The great characteristic lies in the fruit. In *Wormia* after the petals have fallen, the sepals close over the pistil and when the fruit is ripe the carpels expand, becoming of a beautiful rose pink or white. They split along the edge and display the small black seeds clad in a scarlet aril. These pink stars of carpels, two inches or more across in the common species *W. subsessilis* are nearly as attractive as flowers.

In *Dillenia* the sepals once closed over the pistil do not expand any more. They become fleshy and sweet or acid, the carpels enclosed inside do not open, and as they do not ever dehisce, the seeds do not possess a coloured aril, which would be useless in seed dispersal.

*Wormia* seed is dispersed by birds which attracted by the brightly coloured aril swallow the seeds. The carpels split in the very early morning, and though I have constantly looked for seed at say 8 or 9 o'clock, it is usually already gone, so early do the birds find it. The chief disperser of *W. subsessilis* in Singapore is the common bulbul *Pycnonotus analis* who is very keen on the scarlet arils.

*Dillenia* on the other hand is dispersed by Mammals, or the rolling away of the fruit or its floating away on the river, on the banks of which some species grow. The fruit is green or yellow pulpy and sweet. As it never opens arils are useless, so it possesses none. This character however is not always easy to make out in dried specimens as is evinced by Sir George King's having transferred *Dillenia meliosmoefolia* correctly referred by Hooker to *Dillenia* to the genus *Wormia.*

The *Wormias* have been separated into sections according to whether the stamens are all equally long or the inner row is longer than the outer one. This is a good distinction but there is a very good separating point in the petiole. In a certain set, all shrubby and inhabiting swamps, the petioles are strongly winged for the whole length. This broad green wing encloses tightly the bud and protects it from injury from rain, till it is sufficiently strongly developed to separate the wings and appear. There are several species ranging from the Malay Peninsula to Australia, which have this curious arrangement. The others mostly trees have simple unwinged petioles.

Of the wing-stalked species we have two in the Peninsula, viz. *W. suffruticosa,* Griff. and *W. subsessilis,* Miq., to which group may be added, *W. Burbidgei* of Borneo, *W. alata* of Australia, and probably *W. Beccariana,* (Borneo), *W. auriculata,* (New Guinea) and some others.

Of our two species in the Flora of British India Vol. I, p. 35, and also in King's Materials Vol. I, p. 8, *W. suffruticosa* is made synonymous with *W. subsessilis,* Miq. Martelli follows this and adds localities from Borneo (Kuching Sarawak) and suggests that *W. Burbidgei* of Borneo is probably the same thing. The first two species however are quite distinct from each other, always keeping so far as I have seen their characteristics true and not mixing.

*W. Burbidgei,* Hooker is a rather puzzling plant. It is based on a plant brought by Burbidge from Borneo and figured in the Botanical Magazine t. 6531. It has smaller and paler flowers than most species. No one seems to have met with it again, and the figure in the Botanical Magazine suggests that it is a deteriorated plant of one of this group, affected by its cultivation in the houses at Kew Gardens.

Round Kuching however lie big swamps in which among other splendid flowers, grows a plant like a glorified *W. suffruticosa.* Like *W. subsessilis* it forms tall and dense thickets layering itself by its branches in the water, but it is taller and is especially conspicuous from the great size of its flowers considerably bigger than those of *W. suffruticosa,* its very large leaves more strongly dentate, and its white not pink fruit. This is probably the plant referred to by Martelli as *W. suffruticosa.* It might be classed as a variety of *W. suffruticosa* var. *borneensis.*

As there has been so much confusion in our two Peninsular species, I give complete description of them.

*Wormia subsessilis,* Miq. Fl. Ind. Bat. Suppl. I. 618. Ann. Mus. Lugd. Bat. I. 315, t. 9.

A very large shrub forming large thickets in damp open spots. Stem as much as 6 inches thick branching at the base. Branches decurved and rooting at the nodes, where they reach the ground. Shoots and leaves quite glabrous except for a few hairs along the midrib and bases of the nerves behind. Leaves ovate or oblong ovate obtuse, except for the midrib prolonged into a short mucro, margin distantly and very shortly serrate, nerves about 15 hairs straight and parallel, base broad, passing into the broadly winged petiole, which encloses entirely the bud, blade dark green above nerves lighter coriaceous 8-12 inches long 6-7 inches wide, petiole 1½ inch long. Raceme decurved, of 5-6 flowers. Bracts lanceolate claw-like pinkish ½ inch long. Flowers 5 inches across. Sepals ovate obtuse edges ciliate at the tip, 2 outer ones dull red not visibly nerved, nearly ¾ inch long, 3 inner a little smaller green with traces of red coloring. Petals 5 undulate hardly crenate bright yellow 2 inches long 1½ inch wide. Stamens white ¾ inch long, the outer row of staminodes shorter yellow. Styles 7, greenish a little longer than the stamens. Carpels 7, rose pink, sutures and centre white, 1 inch long when fully expanded ovate tipped by the withered style. Seed subpyriform ⅕ inch long black with a red aril.

Common in the swampy open country of the South of the Peninsula.

Singapore: Tanglin abundant; Pulau Tekong (Ridley 3966); Pulau Ubin. Johor: Pinerong Estate (Cantley); Kwala Sedili Besar (Feilding). Distrib. Banca.

var. *borneensis,* n. var. A very tall plant forming dense thickets and layering itself by its branches. Leaves very large 18 inches long and 12 inches across, margins strongly dentate, with thorn-like processes at the tips of the teeth, young parts of the plant branches, buds, petiole and midrib and veins densely silky hairy, adult leaves glabrous. Peduncles over a foot long silky hairy, flowers about 6 to 12. Sepals in flower hairy on the edge. Flowers 4 inches across or more petals bright yellow. Fruit when expanded white.

Borneo, Sarawak: in swamps at Kuching abundant.

*Wormia suffruticosa,* Griff. Notul. IV. 706. Ic. IV. t. 6496.

A more stunted plant straggling up to ten feet tall but commonly 4 to 6 feet, and not forming the dense large thickets of *W. subsessilis.* The leaves resemble those of the latter but the bases are broader and run less into the winged petiole, and the margin is distinctly dentate. When young they are covered with close set white woolly hairs on the midrib and nerves on the back, and this hair persists on the petiole. The hair however disappears to a large extent on the adult leaves. It covers too the young parts of the stem. The flower spikes are stouter than in *W. subsessilis* and the peduncles and branches are also woolly. The flowers much resemble those of the latter species but the sepals often are slightly hairy on the edge, and the petals more obovate and larger, yellow. The stamens white.

The plant is called "Simpoh Gajah." It is rarer in the South of the Peninsula where *W. subsessilis* takes its place. In Singapore it occurs in jungle swamp at Stagmount along the railway, and Jurong. In Johore, I have seen it at Sedenah. In Malacca abundant at Bukit Bruang (Holmberg 712). In Negri Sembilan Cantley's collector sent it from Seremban, and Goodenough collected it (No. 10470) at Rawang.

I have no evidence that it occurs outside the Peninsula.

*W. tomentella,* Mart. Malesia, III. 159. A tree, about 40 feet tall and 2 to 3 feet through with light brown bark. Branches pubescent. Leaves elliptic obtuse at both ends, entire or shortly cuspidate 6-10 inches long, 5 inches wide, above glabrous, nerves 13 pairs, transverse nerves conspicuous beneath, hairy especially on the nerves, petiole 1-2 inches long pubescent deeply channelled not winged. Racemes from the upper axils about 6 inches long pubescent, pedicels 1 inch long pubescent. Sepals oblong obtuse dull red glabrous 1 inch long. Petals spathulate broad, apex rounded 1½ inch long ¾ inch wide, light yellow. Stamens yellow, in two unequal series inner ones longer reddish, pores 2. Pistils 7, glabrous red, styles long, subulate. Capsule white.

Singapore: Garden Jungle, Selitar (Ridl. 6382), Bukit Timah (Ridley 6809); Johore: Tebrau Road; Borneo: Kuching (Haviland).

This is no doubt identical with the Borneo plant on which Martelli based his species. It is by no means a floriferous tree like *W. oblonga,* usually only producing a few flowers at irregular intervals through the year. It is omitted from the Materials.

*W. parviflora,* n. sp.

A small tree, branches pubescent. Leaves broadly lanceolate or ovate lanceolate membranous, base somewhat narrowed, apex acute, margin nearly entire or with a few obscure teeth glabrescent above except the midrib, beneath covered with rough hairs especially on the midrib and nerves, nerves about 18 pairs, reticulations prominent, 6-9 inches long, 2-4 inches wide, drying red, petiole slender not winged ½-1 inch yellow pubescent. Flowers few small on short ½ inch peduncles, pedicels slender 1 inch long. Bracts linear all densely yellow hairy. Sepals obovate rounded densely yellow hairy ½ inch long. Petals obovate thin little longer, margins crisped. Stamens unequal inner series longer than the outer one glabrous.

Malacca: Merlimau (Derry 1077), Ayer Panas (Curtis 3489).

I have not met with this plant myself and have no note of its colour. It is known as "Simpoh Bukit."

*Wormia albiflos,* n. sp.

Large shrub, very pubescent. Leaves elliptic oblong narrowed towards the base, which is rounded, apex cuspidate acute, margins serrate, nerves 24 pairs alternate prominent beneath each ending in a marginal tooth, midrib thick, reticulation nerves prominent, pubescent on both surfaces, softly densely tomentose beneath, above more glabrous, with a thick crest of hair along the midrib, 7 to 10 inches long 3 to 4 wide, petiole 1-1$\frac{1}{2}$ inch long widely sheathing nearly to apex as in *W. suffruticosa,* but densely softly pubescent. Inflorescence from the upper axils panicled, peduncle 3 inches long with two spreading branches of the same length, all softly pubescent. Bracts ovate acute $\frac{1}{4}$ inch long pubescent. Buds globose very shortly pedicelled. Calyx lobes 5 obovate obtuse rounded pubescent on the back $\frac{1}{2}$ inch long $\frac{2}{5}$ inch wide. Petals thin obovate rounded, glabrous white $\frac{1}{2}$ inch long. Stamens numerous glabrous all about equal. Pistils silky hairy. Fruit unknown.

Johore: in wet woods at Tebing Tinggi (Ridley 11053).

A very pretty small-flowered white species. The fruit unknown.

### DILLENIA.

*D. Scortechinii,* King Mss. *Wormia Scortechinii,* King Materials l. c. p. 366.

There is I think no doubt but that this plant is a *Dillenia* as King at first suggested and not a *Wormia.* The fruit resembles that of *D. meliosmaefolia,* but is green and not yellow. The plant is by no means rare in the South of the Peninsula and is quite conspicuous in the woods from its possessing large stilt roots in which the whole tree appears to be supported. So striking is this that visitors on seeing the tree in the Garden Jungle have enquired if it was a mangrove tree. The whole tree is about 60 feet tall with a smooth reddish bark.

It occurs in the Garden Jungle of Singapore.

*Dillenia meliosmaefolia,* Hook. fil. *Wormia meliosmaefolia,* King.

I have carefully examined this plant which is in cultivation in the Botanic Gardens Singapore and cannot find any aril to the seeds, nor does the fruit ever dehisce as those of a *Wormia* do. It is obvious that Sir Joseph Hooker was right in referring this tree to the genus *Dillenia*. It is a fairly tall but not stout tree occurring in the hill forests. In cultivation in the Botanic Gardens in open ground it became more bushy and is flowering at a height of about 12 feet. The leaves are soft and bright green glabrous above and pubescent beneath. The flowers appeared in September. The sepals are in two whorls three outer ones and two inner ones somewhat gibbous and more silky. The petals 5, are narrow oblong obtuse narrowed at the base and lemon yellow 1½ inch long and half an inch wide. The outer two or three rows of the stamens are shorter than the inner rows and yellow with an apiculate connective, the innermost row is white longer and appressed to the carpels. These are ten in number white linear and recurved. Each cell contains 6 non-arillate seeds. The sepals in fruit, are swollen yellow pulpy and acid, the carpels sweet and juicy and the whole fruit is eaten by the Sakais and Jakuns. Indeed it is quite refreshing on a hot thirsty day, though the sepals are decidedly acid. The whole fruit is about an inch through. The tree is known as "Simpoh Bukit" "Simpoh hutan" and "Simpoh jantan."

It occurs in thick forests in Malacca: Ayer Keroh, Ayer Panas (Goodenough 1983), Selandon (Cantley); Negri Sembilan: on Gunong Angsi (Ridley), Selangor at Kwala Lumpur (Curtis 234), Bukit Hitam (Kelsall); The Dindings at Lumut, and Bukit Tungul (Ridley); Perak at Chenderiang (King's Coll. 5787), Tapah (Ridley).

### TETRACERA.

*T. sylvestris*, n. sp.

A tall woody climber in forests ascending to about 60 feet, with grey bark. Leaves at the ends of the branches oblong cuspidate with a rounded base, thinly coriaceous not scabrid, nerves eight pairs, dark green shining above, margin obscurely crenate at the tip, 3 to 6 inches long, 1½ to 3 inches wide, petiole ¼ inch long, hairy. Panicles short and few branched, bearing a few flowers, pubescent. Bracts very small lanceolate. Pedicels ¼ inch long pubescent. Buds globose. Sepals 4 obovate rounded, light green ¼ inch long, margins pubescent, and inner face thickly covered with appressed silky hairs. Petals small white spathulate ⅖ inch long, ⅕ inch wide. Stamens shorter, very numerous white, filaments flexuous. Carpels 4 pale green, styles rather stout tapering, stigma capitate. Follicles polished ½ inch long longer in proportion to their breadth than in *T. assa*.

Singapore: Garden Jungle (Ridley 6179), Changi; Malacca: Merlimau; Selangor: near the Batu Caves (Ridley 8249); Perak: Tapa (Wray 1266).

This plant has been it appears confused with the common *Tetracera assa* D. C., from which however it is very distinct. *T. assa* is a sarmentose shrub, often forming bushes in open country, or climbing in hedges but at no great height, the leaves are much smaller than in *sylvestris;* the flowers larger; the sepals glabrous within are often tinted with red at the top; the stamens more numerous, longer and conspicuously tipped with rose pink. Carpels usually 2.

*T. sylvestris* is a high climber in forests, with larger leaves, of a lighter green and not denticulate as in *T. assa.* The flowers are smaller and the sepals lined inside with silky hairs, the stamens shorter fewer and white slightly yellowish at the tip. The carpels are 4 in number. The young leaves are of a beautiful light reddish pink.

There are a number of species of *Tetracera* more or less described by Miquel and Blume from the Malay islands, Sumatra, Java, etc., but so incompletely in many cases that it is not possible to identify what is meant, and this may be one of them.

*Tetracera fagifolia,* Bl. Bijdr. 4.

This species has not been recorded in the Materials, as a native of our region. It occurs in the Garden Jungle and at Selitar in Singapore (No. 6381 and 6381a of my collections) and is too a native of Java. It is easily recognized by its lanceolate leathery leaves, stiff and polished about 3-5 inches long and 2 inches wide quite glabrous with 8 pairs of prominent ribs. The panicle of flowers is lax, about 6 inches long silky hairy. The sepals silky hairy on the edge and in the middle on the inner side. The flowers resemble those of *T. euryandra,* Vahl.

It does not seem to be very common or more probably seldom flowers as is so often the case with the *Tetraceras.*

### Magnoliaceae.

*Talauma elegans,* Miq. Ann. Mus. Lugd. Bat. IV. 70. *Aromadendron elegans,* Bl. Bijdr. 8.

This fine tree is not recorded for the Malay Peninsula in the Materials. It is a straight tall tree 60 to 80 feet tall, with coriaceous finely reticulated dark green leaves 3 or 4 inches long and 1 to $1\frac{1}{2}$ inches wide elliptic and shortly acuminate, the petiole $\frac{1}{10}$ to $\frac{1}{4}$ inch long. The flowers of the usual magnolia type are a little over two inches long, the petals narrow linear acuminate, white and fragrant. The sepals lanceolate and glabrous. The stamens very slender and hardly half as long as the petals. The fruit is about 3 inches long obovoid narrowed to the base and smooth green with light pink seeds.

It grows in the Garden Jungle near the Fernery (No. 4429, and 5592 of my collection) and I have it also from Machap on the Selandor road, Malacca collected by Derry (No. 511), Curtis obtained it too on Government Hill, Penang (No. 3012). Derry gives the name "Kayu Arang" possibly by some error as this is usually applied to Ebony, and Curtis "Chempaka hutan."

## ANONACEAE.

*Polyalthia Curtisii,* n. sp.

Tree 30 to 40 feet tall, branches dark-colored. Leaves elliptic lanceolate subacuminate blunt, base rounded thinly coriaceous glabrous, nerves hardly elevated 7 pairs, reticulations fine conspicuous 3-4 inches long, $1\frac{1}{2}$ inch wide. petiole $\frac{1}{5}$ inch long. Young leaves and shoots red pubescent. Cyme compound from the branches about 1 inch long golden pubescent with few branches. Bracts small ovate semiamplexicaul, golden hairy outside. Pedicel half an inch long. Sepals ovate hairy $\frac{1}{10}$ inch long. Outer petals linear oblong $1\frac{1}{2}$ inch long, $\frac{1}{4}$ inch wide, hairy outside, inner ones much shorter spathulate obovate obtuse. Stamens numerous, small cells parallel, connective large rounded curved over.

Penang: Telok Bahang (Curtis 3644).

In some respects this resembles *P. sclerophylla,* King, but the flowers are borne on the branches in short panicles, not on clusters in the stem.

*Polyalthia angustissima,* n. sp.

Slender tree about 20 feet tall with dark bark, and fine twigs. Leaves lanceolate acuminate glabrous shining little over 3 inches long 1 inch across, nerves not very conspicuous beneath 6 pairs, (young leaves rose pink), petiole $\frac{1}{8}$ inch long black pubescent. Flowers shortly pedicelled, pendulous beneath the branches, not on the stem, pedicel $\frac{1}{10}$ inch long, golden pubescent. Sepals 3 very small lanceolate acuminate $\frac{1}{01}$ inch long, golden hairy. Petals 6-7, bases gibbous above linear acuminate sparingly hairy with long appressed hairs, cherry pink at base gradually getting lighter to yellowish at the tip, $2\frac{1}{2}$ inch long, hardly $\frac{1}{01}$ inch wide, sides involute, not keeled. Stamens quadrate, connective dilated incurved, in 3 rows white. Pistils 7-12 hairy, styles conic. Fruit carpels few, 2 or 3 globose as large as a red currant, minutely apiculate quite glabrous $\frac{3}{8}$ inch long, bright red pedicels $\frac{1}{10}$ inch long, pericarp pulpy. Seed 1, rounded oblong smooth light brown.

Singapore: sandy woods Changi (Ridley 5917), Bukit Timah (8050), Garden Jungle (4813); Johore: Kwala Sembrong (Kelsall 4047). "Sisik Managon."

This tree is quite distinct from the plant—I believe was intended for *Unona stenopetala* by Hooker, the leaves of that being very much larger. It has a typical *Polyathia* fruit. Specimens in flower have been referred to a variety of *Unona stenopetala* at Kew.

It is always more or less in flower in the gardens but seldom fruits.

*Polyalthia pumila,* n. sp.

Dwarf shrub about a foot tall little or not branched. Stem black densely covered with rusty hairs. Leaves elliptic or oblanceolate coriaceous, base broad nearly sessile, above dark glabrous, beneath paler, minutely red dotted, and sprinkled with hairs, nerves above inconspicuous beneath prominent about 12 pairs, alternate, meeting in an undulate intramarginal nerve some way from the edge 8-10 inches long, 3 inches wide petiole swollen $\frac{1}{4}$ inch long densely red hairy. Flowers solitary axillary nearly sessile bright orange color. Calyx lobes 3 triangular lanceate obtuse, silky hairy outside less hairy within $\frac{1}{10}$ inch long. Petals 3 outer ones, linear lanceate subacute $1\frac{1}{4}$ inch long by $\frac{1}{10}$ inch wide dilated at the base but not excavate silky hairy especially at the base glabrescent upwards. Inner petals 3, $1\frac{1}{2}$ inch long, narrower linear glabrescent. Stamens minute cuneate. filament very short, connective rounded recurved. Back of anther keeled. Carpels few stigmas short densely silky.

Dindings: Telok Sera Woods (March 7996); Johore: Gunong Janing (Kelsall.)

The most dwarf *Anonacea* I have ever seen, with a short stem large coriaceous leaves like those of *Agrostistachys* and rather large handsome orange flowers. Kelsall gives the Johore name of "Kananga Merah." I have not seen fruit of this but I take it to be a *Polyalthia.* It is remarkable not only for its small size but for the inner petals being considerably longer than the outer ones.

*Mitrephora crassipetala,* n. sp.

A tree, branchlets pale. Leaves oblong or oblong lanceolate, acuminate acute glabrous drying grey, nerves elevated beneath 9 pairs looping within the margin, base rounded, 6 to 8 inches long $2\frac{1}{2}$ to $2\frac{3}{4}$ inches wide, petiole $\frac{1}{4}$ inch long or a little more. Flowers on short half inch racemes, in clusters on the stem. Bracts $\frac{1}{20}$ inch long ovate persistent. Flowers white hardly opening, sessile on articulations on the raceme. Sepals 3 ovate obtuse, margins ciliate $\frac{1}{10}$ inch long. Outer petals ovate, with a broad base, white $\frac{3}{10}$ inch long apex very thick coriaceous. Inner ones spathulate, limb triangular thick fleshy connivent into a cone. Stamens numerous oblong with a triangular ovate connective crest. Pistils abortive. Female plant and fruit not seen.

Pahang: Tahan River (coll. plant collector Mat in Becher's expedition).

A very distinct plant in its curious little racemes borne on the stem, and its peculiarly thick fleshy flowers.

*Miliusa amplexicaulis,* n. sp.

Branches brown tomentose. Leaves nearly sessile elliptic ovate acuminate base broad unequally bilobed subamplexicaul 7 inches long $3\frac{1}{2}$ inches wide, 12 pairs of nerves elevated beneath above glabrous, beneath sprinkled with hairs, midribs and nerves hairy, young leaves golden hairy beneath, and on upper midrib. Petiole $\frac{1}{10}$ inch. Flowers axillary in pairs on threes on short hairy peduncles, $\frac{1}{4}$ inch long pedicels about as long. Bracts smaller ovate with hairy margins. Sepals 3 ovate subacute with hairy edges. Outer petals similar, slightly longer. Inner petals ovate triangular fleshy broader than long, glabrous, with hairy edges $\frac{1}{10}$ inch long. Stamens about 3 whorls, bases hairy cells approximate, connective broad ovate, glabrous. Pistils several, style very short.

Lankawi: Kwah (Curtis 3205).

## MENISPERMACEAE.

*Tinomiscium petiolare,* Miers.

This plant is common about Singapore in woods, and has been described by Miers, (Contrib. iii. 45. t. 94) and by Sir George King in the Materials for a flora of the Malay Peninsula I. p. 379. The female flowers however have never been described, and I am quite unable to understand what is meant by the descriptions of the male flowers in either account, as they do not coincide at all with the flowers as I see them. The descriptions however were made from dried and perhaps indifferent specimens. I therefore describe the plant afresh from life adding a description of the female flowers from a dried specimen. The plant is a woody climber usually about three inches thick with a milky latex. The leaves are coriaceous dark green ovate oblong obtuse or usually shortly accuminate. The male flowers are in simple racemes tufted from the stem far below the leaves. The flowers are pale green and $\frac{3}{10}$ inch across, the pedicel and a small ovate bract at the base are red hairy. The sepals are 3 or 4, very small ovate acute covered with short red hairs. (I suppose these are the "3 bracts" mentioned in the other descriptions). The petals are in two series. The six outer ones are linear oblong obtuse, the edges minutely white hairy. They are rather unequal in size and the four sepals are opposite to the four largest. These petals are spreading. The inner series are shorter oblong with incurved edges white and glabrous, 6 in number and connivent. The stamens 6, have thick fleshy filaments swollen at the base then narrowed, dilated again and ending in a thick incurved rather beak-like process. The anther cells are widely separated on the outer edges of the thickened upper portion of the filament. I cannot see any trace of a pistil at all.

The female flowers are borne on a long pendulous panicle 18 inches or more long, bearing long distant racemes 8 inches or more long, pubescent, with flowers remote, singly or in twos or threes, on hairy pedicels $\frac{1}{10}$ inch long, the bracts small ovate and hairy. Sepals 2 lanceolate hairy very small. Outer petals linear oblong obtuse pubescent. Inner petals 6 shorter oblong incurved glabrous. Stamens 6 as in male. Drupe green with white spots elliptic flat.

*Nephroica elegans,* n. sp.

A slender twining plant growing among grasses, stem hairy, laticiferous. Leaves deltoid to lanceolate acute or elliptic lanceolate, base rounded, trinerved reticulations distinct sprinkled with hairs, midrib hairy on both sides, 2 inches or less long $\frac{1}{4}$-$\frac{1}{2}$ wide, petiole $\frac{1}{5}$ inch long hairy. Racemes axillary $\frac{1}{10}$ inch long hairy. Sepals very small ovate obtuse 5. Petals outer rotundate ovate acute 3. Inner petals ligulate oblong with two long linear points, 6. Stamens as long 6, with fairly stout filaments and globose anther cells transversely dehiscing.

Tringanu: Cherating river in grass on the shore, Aug. 25, 1889 (Ridley); Dindings: Lumut (Ridley).

The Dindings plant has larger and more elliptic leaves than those of the Cherating plant, some of the latter being very narrowed. The genus is referred to *Cocculus* by the authors of the Flora of British India, but it seems to me a very distinct one, as Miers has arranged it.

*Stephania rotunda,* Lour.

Slender climber stem glabrous. Leaves thin ovate petiole glabrous above beneath scurfy on the nerves, nerves 6 elevated above (when dry) $2\frac{3}{4}$ long, $2\frac{1}{4}$ inch wide reticlations conspicuous, petiole slender scurfy $1\frac{1}{2}$ inch long. Panicles not axillary slender 1-4 inches long, with few slender branches, and umbellate small flowers. Pedicels short. Flower $\frac{1}{10}$ inch across. Sepals linear oblong narrowed at base obtuse 3. Petals ovate rounded larger 2. Inner petals 3 lanceolate oblique. Stamens connate in a round disc, stalked, anthers below the disc.

Lankawi: Kwah (Curtis), also occurs at Bangtaphan, Siam (Dr. Keith).

This has not previously been recorded for the Peninsula, but I think I am correct in referring the Lankawi plant to Loureiro's species.

## POLYGALACEAE.

*Polygala cardiocarpa,* Kurz. Journ. Roy. As. Soc. Beng. 1872, p. 291.

Slender herb branched above glabrous 6 or more inches tall. Leaves alternate thin ovate obtuse 1-2 inches long 1 inch wide narrowed into the petiole which is $\frac{1}{2}$ inch long. Spikes slender 2 inches long, base nude, flowers numerous very small yellow $\frac{1}{10}$ inch long. Sepals 4 ovate rounded, outer ones larger. Petals oblong ovate. Keel not crested, broad ovate with a prolonged tip. Stamens 8. Capsule, sepals deciduous heart-shaped retuse, wings strongly ribbed, seed elliptic black pustulate with a small black caruncle.

Limestone rocks. Selangor: Gua Batu (Ridley 8243); Lankawi: small islands (Curtis 3686), Pulau Sirih (Curtis 2581); Siam: Kasum (Curtis 3256).

I have little doubt that this little herb is the plant described by Kurz. under the above name, though his description is rather short. The original plant came from Tenasserim, and this is another instance of this Tenasserim limestone flora descending as far south as the Kwala Lumpur Caves. On the top of the limestone rocks of this spot I met with this little milkwort.

## HYPERICINEAE.

*Hypericum japonicum,* Thunb. Fl. Jap. 295 t. 31. Hook. fil. Fl. Brit. Ind. I. 256.

A small prostrate or ascending herb from 5 to 10 inches tall, with slender branched stems. Leaves ovate sessile opposite glabrous about $\frac{1}{4}$ inch long blunt.

Flowers solitary axillary on slender peduncles $\frac{1}{4}$ inch long, yellow. Sepals oblong lanceolate. Petals as long as the sepals persistent. Stamens not numerous free nearly to the base. Capsule elliptic oblong or ovoid $\frac{1}{10}$ inch long dehiscing into three valves.

This little weed has been omitted from the Materials for a Flora of the Malay Peninsula by Sir George King, though it is by no means rare. It occurs in pepper fields and rice fields in Singapore and Penang, and probably elsewhere. It has obviously been introduced but has thoroughly established itself.

Singapore: Bukit Timah Road (Ridley 11273) also Chua Chu Kang, and Jurong; Penang: Penara Bukit (Ridley) and Pulau Betong (Curtis 1946).

Its distribution is from India to Japan, China, Java, Australia and New Zealand.

## GUTTIFERAE.

*Calophyllum ferrugineum*, n. sp.

A large tree. Buds, young leaves on the midrib and edges, covered with a close ferruginous tomentum, Branches 4 angled. Leaves elliptic oblong coriaceous apex rounded truncate retuse, above shining, beneath dull, nerves very fine parallel, glabrous except the midrib beneath red tomentose, 3 inches long $1\frac{1}{2}$ inch wide, petiole $\frac{1}{2}$ inch long. Racemes axillary $2\frac{1}{2}$ inch long, peduncle 1 inch thickly red tomentose. Flowers about 8 in a raceme distant on slender pedicels $\frac{1}{2}$ inch or less long quite glabrous. Flowers $\frac{1}{4}$ inch across. Sepals 4, inner suborbicular, outer more ovate smaller. Petals 0. Stamens, anthers oblong. Pistil glabrous. Fruit obovoid an inch long narrowed to the top glabrous.

Singapore: Garden Jungle near Rogie (Ridley 10842, 4799).

This is allied to *C. molle* but differs in the completely glabrous flowers.

*Calophyllum foetidum,* n. sp.

Tall tree about 80 feet tall, and 8 inches through, bark flaky. Leaves elliptic narrowed to the petiole very shortly narrowed to the tip, coriaceous fine nerved, $1\frac{1}{2}$-$3\frac{1}{2}$ inches long, 1-$1\frac{1}{4}$ inch wide, petiole $\frac{1}{2}$ inch long. Flowers small $\frac{1}{4}$ inch across foetid, in lax racemes axillary 3 inches long of about 8 flowers, pedicels slender $\frac{1}{2}$ inch long. Bracts very small ovate caducous. Sepals 4 ovate lanceolate reflexed glabrous. Petals 4 obovate subspathulate apex rounded base narrowed $\frac{1}{10}$ inch long. Stamens very numerous shorter. Pistil conic glabrous style longer than the stamens, stigma discoid. Fruit small elliptic about $\frac{1}{4}$ inch long.

Singapore: Garden Jungle (Ridley 13305, 14119, 11958 and 6935); Malacca: Bukit Bruang (Derry).

This tree is remarkable for the small size of its flowers, which possess a very unpleasant odour. It is one of the comparatively few species in this region which possess petals and have lax racemes of distant flowers.

### GARCINIA.

The *Garcinias* are often difficult to make out from dried specimens as they do not preserve well and further being unisexual one is apt only to get hold of plants of one sex. Three species of the small fruited ones commonly known as Kandis by the Malays, have thus been confused in the Materials. Indeed under *G. nigrolineata,* Plouch. King suggests that his description may cover two species. I have been able to study these plants from living specimens in the forests, and find that what he classes as *G. nigrolineata* covers three species, viz., the true *G. nigrolineata* of Pierre, a species apparently undescribed for which I propose the name *Garcinia globulosa,* and the *Garcinia parvifolia,* Miquel.

*Garcinia nigrolineata,* Pierre Fl. Cochin-Chinensis VI. p. xxix, t. 81, fig. 1 F.

Tree 30 to 40 feet tall, branchlets above subangled. Leaves coriaceous lanceolate acuminate, glabrous, narrowed to the base, 3 to 6 inches long 1-2 inches wide, nerves fine ascending numerous petiole $\frac{1}{2}$ inch long. Male flowers in umbels of 4 to 10, pedicels $\frac{1}{10}$ inch long, flowers $\frac{1}{10}$ inch long, on the tips of branches. Sepals orbicular fleshy concave 4. Petals longer lanceolate oblong subobtuse. Stamens about 20, forming a compact mass. Filaments very short, anther cells 4 broad with a thick connective, no pistil. Female flowers in umbels of four on the termination of branches, larger than the males, pedicels short thick $\frac{1}{10}$ inch long. Sepals orbicular concave rounded. Petals oblong lanceolate acute, longer. Ovary ovoid, stigma large papillose convex. Staminodes about 8, resembling the stamens. Fruit fleshy an inch through oblong, globose, crowned with the thick apiculus bearing the pustular stigma.

Singapore: Changi (Ridley 5005, 3611, 1967, 4644), Sungei Morai (4643), Tanjong Sukopek (3992); Johor: Gunong Pulai (Ridley); Pahang: near Pekan (Ridley); Malacca: Nyalas (Derry), Bukit Bruang (Ridley 4645); Penang Waterfall: Stone Quarry (Curtis 2412); Dindings: Pangkor (Ridley 7969); Lankawi: Kwah (Curtis); Carimon Islands (Ridley 7111).

"Kandis Jantan." This is a very distinct plant from the common Kandis, and is doubtless the plant referred to by King as the specimens with lanceolate acuminate leaves (p. 165). The typical leaves of this plant are narrow stiff and finely veined but it has also in some specimens which I cannot separate distinctly ovate leaves much broader. I find however narrow leaves as well on all or nearly all the broad leaved specimens. The Lankawi plant has the foliage of the narrow leaved form, but as the flowers, male, are very much larger it may be a distinct variety. This plant is undoubtedly Pierre's *G. nigrolineata* and I think also Anderson's plant in the Fl. Brit. Ind. though I have not seen the type. King's *nigrolineata* may be this partly but nearly all the specimens distributed under this name by him belong to a very distinct plant.

*Garcinia globulosa,* n. sp.

A fairly tall straight tree with rough bark scaling off. Leaves elliptic acuminate thinly coriaceous many-nerved, the nerves fairly conspicuous, 2 to 3 inches long, and 1½ inch wide, the petiole ¼ inch long. The male flowers in terminal or axillery umbels bright yellow 6 or 8 in an umbel, pedicels ⅕ inch long. Sepals 4 rounded gibbous small yellow. Petals 4 oblong rounded at the tip, ⅕ inch long lemon-yellow. Stamens about 20 in a cluster on a short cylindric column, anthers brown square flat at the top. Female flowers in terminal and axillary umbels of 4 or 5, larger pedicel thicker and angled. Sepals rounded orbicular 1/10 inch long. Pistil ovoid. Stigma not stalked large rounded pustular. Fruit globose orange half an inch through, not umbonate. Stigma sunk in a depression and almost concealed. "Kandis" common in forests.

Singapore: Common Garden Jungle (Ridley 9195), Bukit Timah (9142, 4450), Selitar (266, 1968, 1966, 1825), Alma and Changi (Hullett 41); Malacca: Bukit Bruang (Goodenough 1270), Selandor (Cantley); Selangor: near Ulu Selangor (King's Coll. 8539); Perak: Batu Togoh (Wray 2531 and 3183).

This is the common little round fruited Kandis of the forests which is quite pleasant to eat. It often fruits heavily and one can get quite a basket of it from one tree. I once attempted to cook it to see if it would do for a pie, but found it not a success. It seemed to develop an astringency and toughness in the skin on cooking that spoilt it.

*G. parvifolia,* Miq. Fl. Ind. Bat. Suppl. 495.

A small tree much branched with rather rough bark, but not scaly as in the preceding. Leaves dark green thinly coriaceous dull elliptic acuminate narrowed at the base, apex cuspidate 4½ inches long 1½ inch wide, with a cusp half an inch long, the petiole half an inch. Male flowers in loose heads of 2 or 3 on pedicels ¼ inch long. Sepals 4 short ovate yellow. Petals 4 oblong tip rounded, widely spreading $\frac{1}{4}$ inch long cream colour. Stamens about 30 in a sessile head, filaments oblong short spreading. Anthers fawn coloured truncate quadrate. Female flowers in axillary and terminal cymes of 3 to 5 sessile, pedicels thick green $\frac{1}{10}$ inch long. Sepals 4, 2 outer ovate rounded green $\frac{1}{20}$ inch long inner smaller yellow. Petals yellow oblong rounded $\frac{1}{10}$ inch long. Stamens (abortive) 4, narrow linear clubbed at the tip. Pistil subglobose. Stigma orbicular, margins lacerate with short papillae, top covered with erect papillae pale white obscurely 6 lobed. Fruit elliptic in outline pulpy orange colored slightly inaequilateral, umbonate at the top and blunt, the stigma very small sunk in a depression and almost quite concealed, an inch and a half long and nearly an inch through. Cells 6 with 3 to 5 seeds developed.

Singapore: Garden Jungle (Ridley 3586a, 14122), Bukit Timah (4450 and 10744).

It flowers and fruits most of the year. The larger broader leaves, the larger male flowers and the shape of the fruit distinguish the plant readily.

### KAYEA.

*Kayea ferruginea,* Pierre Fl. Coch. t. 99.

This is omitted from the Materials. It is a fairly large straggling tree found like most of the genus overhanging streams or rivers in forests. The leaves are leathery and stiff lanceolate caudate acuminate 3 to 6 or 9 inches long, 1-2 inches wide quite glabrous, petiole $\frac{1}{4}$-$\frac{1}{2}$ inch long. The fruit is large an inch through the sepals, ovate oblong rather longer leathery, scurfy outside polished within. I have not seen flowers of it, but have it in fruit from Johore, collected by Kelsall at Sungei Sembrong, and by myself on the river bank at Kota Tinggi (4187); Pahang at Ayer Hitam, near Pekan, and from the Dindings where R. Derry collected it. This latter has unusually long narrow oblong leaves, but I take it to be the same. It varies a good deal in the form of the leaf. Kelsall gives the name "Buah Sembawang" for it.

*Kayea rosea,* n. sp.

A medium sized tree. Leaves in distant pairs elliptic cuspidate apex acute base obtuse or shortly acuminate, coriaceous glabrous smooth above nerves 20-25 pairs raised beneath 8 inches long, 3 inches wide, cusp ½ inch long, petiole thick ¼-½ inch long. Flowers rosy white panicled, panicles 1 or 2 terminal, 3 inches long, branches short, rachis thick corky rugose light brown. Pedicels ⅕ inch long outer sepals orbicular thick ¼ inch long petals ovate ribbed, a little longer. Stamens numerous short, filaments short linear, anther cells curved. Fruit not seen.

Johore: By streams Gunong Panti (Dec. 1892) Ridley.

The only paniculate species yet recorded from the Peninsula.

*K. rivulorum,* n. sp.

Small straggling tree branches with long internodes. Leaves opposite in pairs with 4 small ovate stipule like leaves above them, in a cluster, main leaves lanceolate long cuspidate base hardly narrowed 5 to 6 inches long 1½ to 2 inches across, nerves about 14 pairs depressed above, elevated beneath leaf altogether glabrous and thinly coriaceous, petiole ⅒ to ⅕ inch long; small leaves ovate acuminate ¼ inch long cordate sessile. Flowers 3 or solitary terminal almost sessile, surrounded at the base with small ovate acuminate bract-like leaves ½ inch long. Sepals ovate coriaceous ½ inch long. Petals narrow linear oblong longer. Stamens very numerous long slender, ovary conic acuminate, style shorter stigma apparently entire. Fruit conic acuminate 1½ inch long ½ inch through, with shorter persistent sepals.

Malacca: Sungei Hudang, Ayer Ular Bulu (Goodenough 1976); Selangor on the stream at the Camphor forest Rawang (Ridley 7349). It is known as K'luet.

From *K. caudata,* King this differs in the larger leaves and shorter petiole, the almost sessile flowers, the ovate bracts.

## TERNSTROEMIACEAE.

*Adinandra parvifolia,* n. sp.

A big tree. Leaves ovate narrowed at the base coriaceous, apex obtuse or rounded glabrous, upper surface pustulate minutely, nerves 8 pairs indistinct above, nerves and reticulations conspicuous beneath, midrib prominent 1½ to 2 inches long ½ to 1 inch across petiole ¼ inch long. Flowers large ½ inch across, axillary on long peduncles ½ to nearly 1 inch long. Sepals orbicular pustular coriaceous edges ciliate. Stamens numerous silky. Pistil glabrous.

Perak: Larut Hills, the Cottage (Ridley 5236).

Really I think nearest *A. macrantha,* but the leaves are much smaller than any other species known to me, and ovate sometimes almost obovate.

## DIPTEROCARPEAE.

A number of species have been added to this order since the publication of the Materials, among which are

*Shorea barbata,* Brandis Journ. Linn. Soc. XXXI. p. 81. This is one of the trees known here as "Resak," and produces a high class timber. It has rather small ovate lanceolate coriaceous leaves with a dense greyish yellow pubescence beneath and long lax panicles of grey buds. The flowers are small with 20-30 anthers bearded at the tip. The pistil is woolly also. This plant has only been collected in Malacca at Batang Malaka by Goodenough (No. 1789) and the fruit is as yet unknown. It is allied to *S. ciliata,* King.

*S. gibbosa,* Brandis lc. 99. Is a lofty tree with brown rough bark. The large branches are peculiar in dilating at the base into a kind of triangular boss of large size, as if they were putting out buttresses. The leaves are 4 inches long and two inches across, glabrous dark green and rather thin in texture ovate acuminate. The flowers are small and pink in few flowered secund racemes. The sepals are woolly, the petals glabrous inside and woolly outside. Stamens ten. The fruit not described by Brandis is elongate nearly cylindric with a short point half an inch long ¼ inch through and covered with a fine silky wool; the wings are 5, the three outer ones 2½ inches long narrowed at the base and gradually dilated upwards to the rounded tip where they are ¼ inch wide, the 3 inner ones are shorter and narrower 2 inches long, all covered with thin wool.

I have only seen a single tree of this fine Dipterocarp. It grows in the grounds of Rogie, Tanglin on the side of the Garden road. It is distributed under the numbers 6079, 6686.

*Sh. rigida,* Brandis Icones, Plantarum Tab. 2402.

This is a lofty tree, with rough dark bark on the branches which are covered with lenticels and when young with a kind of scarf also. The shoots are enclosed in bright pink bracts which make the young plants showy. The leaves are large rather stiff 6 inches long or more, quite smooth above, beneath the nerves are much raised, and it is dotted all over with little woolly warts from which on the midrib spring single rather stiff hairs. The flowers are white in clusters on short branches of a loose panicle about 6 inches long, are themselves ¼ inch long, with a silky calyx and oblong petals very silky outside and glabrous within. It has 50 stamens with nearly circular anthers. The fruit is ovoid hardly half an inch long the wings are bright red quite glabrous, linear 4 inches long and half an inch wide, (the inner ones 2 inches long and only half as wide), hardly dilated at all for their whole length, finely marked with longitudinal ribs and transverse bars. This fine tree grows in the Garden Jungle (No. 6393) and I met with it too at Perhentian Tinggi (No. 10053). It fruits abundantly and comes up readily.

### ANISOPTERA.

Only one species of *Anisoptera* is recorded in the Materials. There are however three kinds known here *A. Curtisii,* King, easily distinguished by its narrow leaves bright yellow beneath.

A. *costata*, Korth. Verh. Nat. Gesch. Bot. 67. t. 6. A gigantic tree with large buttresses and rather pale colored bark. Leaves oblong coriaceous with a broad base blunt, glabrous above with close yellowish brown tomentum beneath, nerves numerous close set about 25 pairs, and reticulations distinct beneath, 4-6 inches long and 3 inches wide, petiole 1½ very rough. Panicles axillary and terminal 6 inches long covered with scurfy wool in tufts. Flowers ¼ inch long yellow. Sepals lanceolate acuminate densely pubescent. Petals glabrous lanceolate acuminate mucronate. Fruit globular 1 inch through, tomentose, wings two very large 7 inches long 1½ inch wide slightly narrowed at the base and dilated a little upwards rounded at the tip, with three strong nerves running the whole length and numerous transverse bars the other three wings about 3 inches long very narrow with only 2 main nerves. The whole fruit is light brown. Some magnificent trees of this fine plant grow in the Garden Jungle (Distrib. No. 6684) and in Dalvey ground. The leaves in sunlight have a striking coppery yellow appearance specially conspicuous when wind blows. I have it also from Batu Tiga in Malacca collected by Holmberg under the name of Mersawar Ular. It was originally described from South East Borneo. I believe it is the chief source of the timber commonly known as Mersawar which is in quality like a rather inferior Meranti.

A. *glabra*, Kurz. Flor. Fl. Brit. Burmah i. 112.

A fine straight tree running to 100 feet high, with dark brown bark. Leaves lanceolate acuminate base rounded quite glabrous about 3-6 inches long and 1½ inch wide. The flowers are small and pubescent. The fruit globular, about ¼ inch through with linear wings narrowed slightly at the base 3½ inches long and ⅓ inch wide with three strong ribs and transverse bars. It occurs in the Garden Jungle (No. 6886 fruit).

Malacca: Selandor (Holmberg 841), and Merlimau (N. Cantley), Machap (R. Derry 1166), and is known as Mersawa Merah. It is also a native of Burmah.

*Cotylelobium flavum,* Pierre Fl. For-Cochinch. fasc. 16 t. 258a.

This is one of the Plants known here as Rassak. It seems to be rare here as I have only seen it from Sungei Morai in Singapore (4630 and 3619a of my collections) and it is not recorded in King's Materials. It has stiff lanceolate leaves quite smooth and polished above and covered with a soft short grey tomentum of minute stellate hairs, the nerves are almost invisible without a lens. The flowers are very numerous in short panicles all covered thickly with stellate woolly hairs about $\frac{1}{5}$ inch long. The fruit which I have not seen is described as tomentose globular the two large wings free to the base 2 inches long, blunt, the other three linear lanceolate acute and only $\frac{3}{4}$ inch long. It is also a native of Sarawak.

*Hopea globosa,* Brandis l.c. 61. This is based on a plant collected by Wray, at Thaiping, Perak. The only type specimen I have seen is a poor one but I have collected fruiting specimens of a tree rather small for this genus at Chua Chu Kang, in Singapore (No. 6585) and have also received it from Rantau Panjang, in Selangor under the name of Chengal Paya. The leaves are ovate acuminate 4 inches long, rather coriaceous with the nerves prominent on the back. The fruit in Wray's specimen seems young—it is pubescent and does not show the true wing veins. In the others, adult, there are 7 distinct nerves and the wings are glabrous. The large wings are broad and elliptic half an inch wide, the small ones quite small and rounded. Flowers of this tree are much wanted.

*Vatica ovalifolia,* n. sp.

Tree. Leaves ovate acuminate thinly coriaceous base rounded, apex acuminate obtuse glabrous, nerves 6 pairs prominent, reticulations fine and conspicuous, 7 inches long 4 inches wide, petiole ½ inch long. Panicles lax on the ends of branches about 6 inches long, branches 2-3 inches long, silvery scurfy pubescent. Flowers ½ inch long. Sepals ovate acuminate pubescent $\frac{1}{10}$ inch long. Petals lanceolate obtuse narrowed to the base, backs pubescent, inner surface glabrous, half an inch long ⅕ inch across. Stamens very short fifteen. Anthers oblong, cells very unequal, connective very short prolonged, filament shorter than the anther dilated at the base. Ovary minutely pubescent, style stiff conic ribbed, stigma capitate papillose. Fruit not seen.

Province Wellesley: Nibong Tebal (C. Curtis 3458).

*Vatica Lankaviensis,* n. sp.

Leaves elliptic or elliptic lanceolate obtuse base cuneate, coriaceous glabrous nerves 8 pairs prominent on both surfaces closely reticulate on the back, pale in color when dry, lighter on the back 3-5 inches long 1½-2 inches wide, petiole ½ inch long. Panicles axillary and terminal lax spreading 4-6 inches long, branchlets angled covered with stellate tomentum, pedicels $\frac{1}{10}$ inch long. Sepals fleshy ovate triangular quite blunt, densely tomentose, $\frac{1}{12}$ inch long. Petals spirally twisted thick drying black oblong obtuse half the back covered with stellate tomentum inside glabrous ⅖ inch long. Stamens 15 very short, outer whorl much shorter than inner ones. Anthers nearly sessile oblong, cells subequal, connective prolonged into a short reddish blunt point longer than the filament, ovary hairy style short thick glabrous, stigma capitate.

Lankawi: Kwah (Curtis 3410).

*Vatica Kelsalli,* n. sp.

Tree. Leaves coriaceous glabrous lanceolate obtuse nerves about 5 pairs conspicuous beneath, finely and closely reticulate beneath, above dull or slightly shining beneath pale 5 inches long 1-2 wide, petiole half an inch. Panicles axillary and terminal 2-3 inches long, branches numerous short scurfy tomentose. Flowers numerous small white ⅙ inch long or shorter thick peduncles. Sepals lanceolate obtuse scurfy. Petals little longer obtuse, scurfy. Stamens 10 very short, anthers elliptic, prolongation of connective very short rounded. Pistil glabrous, style short stout, stigma flattened obovate.

Johore: Kwala Sembrong (Kelsall 4064).

## TILIACEAE.

*Eloeocarpus rigida,* n. sp.

Tree, bark of branches dark colored. Leaves coriaceous elliptic ovate cuspidate margins obscurely crenulate apex obtuse base shortly cuneate quite glabrous, but pustulate nerves 5 pairs elevate on the lower surface, reticulations conspicuous 4 inches long 2 inches wide petiole rather stout $1\frac{1}{2}$ inch long. Racemes axillary from below the leafy portion 2-$2\frac{1}{2}$ inches long. Flowers white, on peduncles $\frac{1}{5}$ inch long tomentose. Sepals 5 triangular lanceolate pubescent $\frac{1}{10}$ inch long. Petals 5 as long, cuneate laciniate pubescent not glandular. Stamens 15 margins shorter than the petals, filaments very short, anthers linear, with a small tuft of white hairs on the tip. Torus a shallow lobed grey tomentose cup, ovary ovoid grey tomentose. Style longer glabrous.

Singapore: Bukit Timah (Ridley 4949, 3641).

The stiff glabrous leaves are peculiar in this plant. The petals are much laciniate the primary lobes divided into 2 or more filaments. The torus is curiously undulately lobed.

## STERCULIACEAE.

*Sterculia elongata,* n. sp.

Shrub about 10 feet tall, with brown bark. Leaves simple alternate oblong linear acuminate obtuse base slightly narrowed or not, margins entire parallel straight or undulate, glabrous subcoriaceous 6 to 12 inches long 2 inches wide, nerves distinct on the lower surface 18 to 26 parallel meeting in loops $\frac{1}{5}$ inch from the margin, petiole $\frac{1}{2}$ to $1\frac{1}{2}$ inch long, thickened at the apex. Raceme 6 inches long from the upper leaf axil lax about 14 flowered, rachis shortly hairy. Pedicels $\frac{1}{2}$ inch long. Flower pubescent tube campanulate $\frac{1}{5}$ inch long, lobes linear hairy jointed by the tips $\frac{3}{10}$ inch long. Androecium shorter than the tube glabrous, sessile, anthers eight. Female flowers unknown. Carpels 5 when spread open elliptic ovate cuspidate 2 inches long 1 inch wide red pubescent externally. Seeds 4 in each carpel, subglobose.

Singapore: Bukit Timah, Bukit Mandai, Chan Chu Kang (Ridley); Malacca: Bukit Kandong (N. Cantley's coll.).

The long narrow leaves with curiously undulate margins in some specimens, and very numerous nerves with the large flowers distinguish the plant from any known to me.

*Sterculia Lancaviensis,* n. sp.

Small tree, deciduous producing its flowers in the dry season when the leaves are fallen, bark grey corky wrinkled. Leaves grey when dry obovate apex rounded glabrous with 5 pairs of ascending nerves $3\frac{1}{2}$ inches long $1\frac{1}{2}$ inch wide, petiole $\frac{1}{4}$-$\frac{1}{2}$ inch long. Flowers in short lax panicles much branched and about 1-$1\frac{1}{2}$ inches long on the ends of the nude branches stellate pubescent. Male perianth campanulate $\frac{1}{8}$ inch long, lobes lanceolate linear obtuse hairy along the edges. Stamens six in a globose capitulum on a filament as long as the tube. Females perianth campanulate with ovate lobes, $\frac{1}{5}$ inch long, lobes very short scabrid pubescent inside glabrous with 12 strong raised veins, stamens 5 sessile in a small globose tuft.

Lankawi islands: Kwah (Ridley), Terutau (Curtis 3414).

Apparently nearest to *S. bicolor* but with different leaves, and not pubescent beneath, as I can see no pistil. I imagine it has been eaten off by something.

*Sterculia pubescens,* Masters Fl. Brit. Ind. i. 357.

A large tree. Leaves ovate to elliptic rounded at the tip or abruptly cuspidate base rounded, coriaceous glabrous above drying pale 4 inches long $2\frac{1}{2}$ inches wide, beneath densely rufous tomentose with hairs stellately arranged, nerves about 8 pairs, 4 inches long, 2½ inches wide, petiole densely rufous hairy about an inch long. Panicles 6 inches or more long rufous-tomentose, with numerous short branches half an inch or less long. Flowers very small densely tomentose, $\frac{1}{10}$ inch long. Calyx campanulate cleft half way into 5 short ovate acute lobes hairy on both surfaces. Male androecium small the length of the tube, filaments slender nearly as long as the tube, anthers 8 in a globose mass. Females not known. Carpels 4 ovate shortly beaked, when expanded outside densely tomentose, inside densely hairy, 2 inches long and 1¼ inch broad. Seeds 4 black.

Penang: Waterfall (Curtis 2762); Lankawi: Terutau island (Curtis) fruits.

I take this to be the very imperfectly known and described *pubescens,* Mast., based on a specimen collected by Maingay in " Malacca " but probably in Penang. The fruiting specimens from Terutau seem to me to be identical as far as I can see with the Penang one which is in flower.

*Sterculia hispidissima,* n. sp.

Shoots covered thickly with rough red hairs. Leaves crowded at the ends of the branches elliptic or oblong entire with a broad truncate base, shortly cordate, blade dilated a little in the middle, and slightly narrowed to the cuspidate tip, texture rather thin, above covered with scattered rough pale hairs, and on the nerves and reticulations small stellate tufts of hairs, distant, beneath more thickly covered with stellate hairs and long rough hairs; midrib densely tomentose with stellate hairs, and numerous pale rough hairs interpersed, 4 to 6 inches long, 2-3 inches wide, nerves 7-10 pairs petioles half an inch long red hairy. Panicles numerous crowded at the ends of the branches 6-8 inches long densely rough hairy, branches short 1 inch or less with few short slender branches hairy. Flowers ⅓ inch long tube campanulate as long as the linear ciliate lobes. Androecium one third as long as the tube, anthers 8. Female flowers and fruits not seen.

Selangor: Ulu Gombak (Burn-Murdoch No. 153).

I have a sheet of this curious *Sterculia* in Cantley's collections made about 1885, with a Singapore ticket on it but no locality, and recently Burn-Murdoch sent it from Selangor. It is remarkable for its great hairiness being covered with two kinds of hairs, one long slender pale, the other velvety hairs in small tufts..

## BURSERACEAE.

*Trigonochlamys grandifolia,* n. sp.

A tree, leaves over a foot long, the petiole 4 inches long or less, densely covered with red tomentum, leaflets opposite three pairs and a terminal one, elliptic obtuse or cuspidate, base rounded or shortly cuneate, margins denticulate, stiffly coriaceous, above glabrous beneath covered with red tomentum, nerves 12 pairs strongly elevate beneath with elevated transverse nervules petiolules $\frac{1}{4}$ inch, densely red tomentose as is the rachis, leaflets 6 inches longer less 2 inches wide. Panicle shorter than the leaves. Male about 6 inches long, female shorter, all densely red tomentose, with few short branches. Flowers crowded, sessile half an inch long. Male flowers on longer panicles than the females. Calyx campanulate half an inch long with deltoid acute lobes 3, $\frac{2}{5}$ inch across, very coriaceous and densely red hairy. Petals 3, as long thinner lanceolate obtuse, back centre hairy, margins glabrous. Stamens 3 glabrous filaments free to the base, anthers lanceolate connivent. Disc annular setose. Female flowers rather larger and fewer. Calyx and corolla as in the male. Stamens shorter than the style, ovary conic densely tomentose, style stout. Fruit unknown.

Singapore: Bukit Timah (Ridley 10735) male without locality (Cantley) female.

One species only of this genus has been as yet described, *Tr. Griffithii,* a tolerably common tree. This new species is very distinct in its large hairy leaves, and big flowers with only three stamens. In habit it has quite the appearance of a *Canarium* such as *C. rufum,* but has the large flowers of *Trigonochlamys.*

## MELIACEAE.

*Aglaia salicifolia,* n. sp.

A shrub or small tree, glabrous except the inflorescence. Leaves 6 inches long, with 5 leaflets, rachis glabrous, leaflets nearly sessile narrowly lanceolate acuminate at each end equally coriaceous glabrous nerves invisible above, 12 pairs, ascending slightly elevate beneath 4 inches long $\frac{1}{2}$-$\frac{3}{4}$ inch wide. Panicle 6 inches long or less with slender branches, and short branchlets. Rachis scaly, branches and pedicels scurfy. Flowers $\frac{1}{20}$ inch long globose yellow on pedicels longer than themselves. Sepals 5 very short ovate scurfy. Petals 5 oblong much longer glabrous. Staminal tube oblong free glabrous. Anthers moderately large. Style none. Stigma capitate large. Fruit elliptic nearly $\frac{1}{2}$ inch long glabrous on the thickened panicle.

Pahang: Tahan River (Ridley 2660). "Poko Tado Ikan."

I considered this at first as probably what Miquel intended by his *A. Diepenhorstii,* but on comparing it with the description I conclude that it is distinct in the size and shape of the leaves, very characteristic on this plant, and other minor points.

*Aglaia rufa,* Miq. Ann. Mus. Lugd. Bat. IV. 49.

Stems densely covered with thick red stellate hairs. Leaves a foot or more long, (probably very large) petiole stout 6 to 9 inches long densely red hairy, leaflets 4 pairs sessile oblong cuspidate subherbaceous, covered with scattered stellate hairs on both sides and crowded on the midrib 4-6 inches long 3 inches wide. Panicles shorter than the leaves much branched densely hairy 6-12 inches long in the axils forming a dense mass. Flowers minute shortly pedicelled. Sepals 5 ovate acute, with one or two tufts of stellate hairs longer than the flowers. Petals 5 smaller orbicular glabrous. Staminal tube free semiglobose, 5 anthers, glabrous.

Malacca (N. Cantley). "Tambu Gulong" timber used for beams, and the fruit is edible sweet."

I have seen no other specimens of this curious species, remarkable for the dense covering of red hairs stellately arranged all over it, no leaves on the two sheets are complete, so I cannot give the exact size.

*Walsura villosa,* (Wall. Cat. 1264) Dec. Prodr. p. 636.

Leaves under 6 inches long, leaflets five elliptic acuminate, 3-5 inches long 1½ inch wide, thinly coriaceous pale glabrous shining above glaucous beneath when dry, nerves 6 pairs slender, petiolule ⅖ inch long, rachis triquetrous. Panicles 14 inches long minutely pubescent lax, branches 1½ inch long with the branchlets crowded at the top. Flowers shortly pedicelled $\frac{1}{7}$ inch long. Calyx lobes 5 ovate acute pubescent. Petals longer about twice as long oblong pubescent. Stamens 10 nearly free to the base, filaments broad linear hairy. Anthers on the tips rounded pubescent. Ovary silky hairy.

Perak: at Kamuning (Ridley 3022).

This plant which is not recorded in the Materials for a flora of the Malay Peninsula, is a native also of Tenasserim.

## OCHNACEAE.

*Gomphia corymbosa,* n. sp.

A shrub 6 to 8 feet tall or a small tree about 20 feet tall. Leaves oblong coriaceous to lanceolate subacute 4-4½ inches long 1-1½ inches wide dark shining green, petiole ⅕ inch long. Umbels on the ends of short branches many and dense flowered, one inch to nearly 2 inches across. Bracts oblong ovate coriaceous convolute round the base of the pedicel $\frac{1}{10}$ inch long obtuse. Pedicel ¼ inch long slender. Flowers ¼ inch across pure white. Sepals oblong obtuse apex broad deflexed. Petals linear obtuse much narrower. Stamens 6-9, filaments short. Anthers longer oblong. Ovaries 5. Styles short. Carpels obovate reniform. *Gomphia Hookeri,* var. *corymbosa,* King Mat. Fl. Mal. Pen. Vol. I. 475.

Singapore: Top of Bukit Timah (Ridley 10738); Perak: Goping (King's Coll. 4673).

*Gomphia Hookeri* is a shrub frequenting sandy places near the sea, with deep crimson flowers in small umbels. This plant is as regards the Singapore plant at least, (the type) a tree frequenting forests, with larger umbels of smaller pure white flowers.

*Euthemis minor,* Jack Mal. Misc.

This was described by Jack from specimens found in Singapore with the common *E. leucocarpa* Jack, but though I have met with it in Pulau Batam and King records it from Bangka, it appeared to have become extinct in Singapore, I was therefore very pleased when on visiting the banks of the river at Chua Chu Kang to find a quantity of this pretty plant growing with *E. leucocarpa* in the sandy woods above the river. King's description of it is very poor. He merely mentions that its leaves are obscurely veined, a difference which is hardly noticeable in the living plant, and that the leaves are nearly entire, and the berries red. These he gives as distinguishing points, but the berries of *E. leucocarpa* are as often red as white, varying from white to rose and rose to deep red. Jack's description is fuller and gives the points of this plant well. It is smaller and more prostrate than *E. leucocarpa* with dark brown bark. The leaves are more distant and much smaller 3 to 4 inches long 1¼ wide or even smaller narrowly lanceolate dark green above and paler beneath, the petiole is winged to the base as in *leucocarpa* but much less distinctly so. The surface of the leaves is quite smooth and though the thickened edge is serrate the minute thorns which arm the teeth are very inconspicuous and often not developed at all. The panicle is very distinct. It is much longer than the leaves, nearly 6 inches long and quite lax, hardly branched, the flowers being mostly in pairs, with green lanceolate persistent bracts $\frac{1}{4}$ inch long. The flowers, open one in each pair at a time, after which the pedicel elongates somewhat so that the young fruit of one pair is well developed before, the second flower is open. The sepals are ovate ciliate, $\frac{1}{10}$ inch long, green, becoming pink as the fruit ripens and fallen before the fruit is ripe. The whole flower is smaller than that of *E. leucocarpa*. The petals are linear oblong white, and the stamens much resemble those of that species. The ovary is brighter green and conic but angled, while that of *leucocarpa* is nearly white and quite smooth and rounded. The fruit is quite different. It is strongly five angled, and this is most conspicuous before it is ripe and when still green, but when fully ripe the angles are still visible and the top of the fruit nearly flat and very dark red, not at all resembling the globose round topped fruit of *E. leucocarpa*. The plant grew in some abundance in one spot in a sandy wood, where *E. leucocarpa* (some plants of which attained a height of over six feet) was plentiful, and *Dipteris Horsfieldii* formed a large thicket. It was probably more abundant in Singapore at one time as it is not probable that Jack reached this part of the island which must in his time have been quite inaccessible. There is no evidence of its occurrence in Penang as mentioned by Hooker in the Flora of British India.

## SAPINDACEAE.

*Capura pulchella*, n. sp.

Shrub little branched about 6 feet tall. Leaves with 4 or 5 leaflets, elliptic lanceolate coriaceous dark green, nerves inconspicuous 8 pairs, 6 inches long or more 3 inches across, petiolule $\frac{1}{10}$ inch long; petiole 3 inches long. Stipules ovate obtuse 2 inches long $1\frac{1}{2}$ inch wide, all glabrous. Racemes slender 6 inches long, with distant flowers about 20, glabrous. Bracts minute lanceolate acuminate 1 mm. Peduncles very short thick each bearing 1 or 2 flowers. Pedicels $\frac{1}{10}$ inch long. Sepals 4 ovate rounded glabrous reflexed cream color with minute red spots as long as the pedicels. Petals oblong obtuse larger margins ciliate creamy straw color, 4. Stamens 8, filaments short white ciliate cylindric. Anthers longer elliptic flattened yellow, pollen yellow. Disc annular cushioned, rose pink surrounding the stamens and pistil. Pistil small, ovary free, conic stigmas 2 pink. Cells 2, ovales 2. Fruit drupaceous 1-2 seeded, at first red thin black.

Borneo: Kudat (Ridley).

This pretty shrub, I found some years ago near the sea in Kudat, and have had in cultivation in the Botanic Gardens since. It is quite attractive with its sprays of yellow flowers and red fruit, and its curious stipules. The petals are rather peculiar in shape. They are minutely clawed at the base with a short cylindrical claw. The lamina projects inwards just above forming a small sac at the base.

*C. Hullettii,* n. sp.

Branches slender dark when dry. Leaves simple, lanceolate acuminate with a long point rounded at the tip, slightly narrowed at the base quite glabrous, nerves 6 pairs conspicuous beneath, 5 inches long 2 inches wide, petiole 1 inch long swollen and geniculate for about half its length. Stipules ovate rotundate to orbicular cordate at the base and shortly petioled, coriaceous half an inch long. Panicles very lax 3-4 inches long with few branches 2 inches long or less. Flowers on pubescent peduncles $\frac{1}{4}$ inch long. Sepals 4 small $\frac{1}{20}$ inch long ovate acute pubescent. Petals 4 $\frac{3}{10}$ inch long linear oblong stellate pubescent. Stamens 8, filaments very short glabrous. Anthers oblong apiculate. Disc small annular glabrous. Ovary conic pubescent, style cylindric glabrous with a conic stigma with several minute lobes, much longer than the stamens.

Malacca: Mt. Ophir (Hullett 781).

The genus *Capura* was based upon a Philippines plant, *C. pinnata,* Blanco (*C. nigrescens,* Villar) to which both these species seem allied. The genus *Otophora*, Bl. has been added to *Capura* but there seem to be sufficient characters to keep them separate.

## AMPELIDEAE.

*Vitis (Ampelocissus) floccosa*, n. sp.

A slender-stemmed vine of the habit of *V. gracilis*, stems covered with loose red felted tomentum. Leaves entire ovate cordate acute. 2 to 4 inches long and as wide, margins entire except for glands at the ends of the nerves, above glabrous (black when dry) beneath covered with dense red tomentum thickly felted, beneath punctate, nerves about 5 pairs, reticulations beneath conspicuous, petiole 1 inch long densely covered with red tomentum. Stipules small caducous. Tendrils slender unbranched glabrescent. Inflorescence very slender about 8 inches long, peduncle $2\frac{1}{2}$ inch long, branches distant $\frac{1}{2}$-1 inch long, slender usually simple, with few 12-14 very small distant flowers. Rachis tomentose, flowers sessile $\frac{1}{20}$ inch long. Calyx saucer-shaped short obscurely toothed glabrous. Corolla oblong obtuse glabrous much longer, tetramerous. Stamens rather large 4. Ovary hemispheric. Berry oblong rounded glabrous $\frac{1}{2}$ inch long when dry, seeds 3 boat-shaped $\frac{3}{10}$ inch long, back convex, with a faint channel down the centre, front acutely angled, all minutely pustular.

Johore: Gunong Pulai (Ridley 3714).

This plant is allied to *V. gracilis* differing in its dense felted tomentum.

## ANACARDIACEAE.

*Swintonia Robinsonii*, n. sp.

Tree, branches dark colored. Leaves stiffly coriaceous lanceolate subobtuse narrowed slightly at tip and base, nerves about 15 pairs not very conspicuous 6 inches long 2-$2\frac{1}{4}$ inch wide, petiole $1\frac{1}{2}$ inch long, dark colored. Panicles short in flower about 3 inches dilating later to about 6 inches. Peduncles and pedicels angled, grooved pubescent when young. Bracts small caducous, ovate edges pubescent. Pedicels shorter than the flowers. Sepals rounded ovate pubescent especially on the margins much shorter than the petals. Petals oblong lanceolate obtuse glabrous outside, pubescent on the inner face, ⅛ inch long. Stamens 5 filaments slender glabrous shorter than the petals. Anthers ovate. Ovary subglobose glabrous. Fruit small, as big as a pea, petals ¼ inch long.

Pahang: Gunong Tahan (Robinson 5391).

In working over the study set of the Gunong Tahan plants in the British Museum, I only saw fruiting specimens of this tree but in specimens of other sets I was fortunate enough to find flowers, so I herewith describe it, as it seems to be distinct from any other species. The fruit appears to be nearly full size and is very small for the genus. The leaves are not pale colored underneath, as in most species, and the petals are pubescent within. This species is most closely allied to *S. puberula,* Pears. of Bujong Malacca, in Perak, differing in its larger leaves with fewer veins, and its petals glabrous outside, and less pubescent angled pedicels.

*Campnosperma oxyrrhachis,* Engl. Anacard. 319. Of this plant only the leaves have apparently ever been described, and I have seen no type, but the plant to be described below has been identified many years ago at Kew as *C. oxyrrhachis* and the leaves resemble the description given, so I propose to describe the inflorescence, and habit.

A small straight tree not rare in open country, among thickets but seldom flowering, little branched. Leaves oblanceolate winged completely to the base, margins undulate apex cuspidate gradually narrowed to the base, epetiolate 15 inches to 3½ feet long 4½-7 inches wide, above glabrous ~~shining~~ when dry, nerves over 30 pairs fine and not very conspicuous above, elevated beneath reticulations conspicuous numerous beneath, back of leaf closely scurfy, midrib semiterete elevated. Panicle large terminal much branched, branches often over 18 inches long slender lax spreading, hairy with short rough hairs. Flowers small green in short cymes. Bracts small linear hairy. Calyx lobes rounded ovate pubescent 5. Petals valvate oblong obtuse glabrous 5. Stamens 5 shorter than the petals, glabrous, anther elliptic. Pistil conic ovoid hairy.

Malacca: Low ground near Ophir (Hullett); Pahang: Tahan River (Ridley 2569), Kwala Lipis (Machado).

The original description was from a plant obtained in Sumatra at Tarentang by Miquel who described it as *Buchanania oxyrrhachis,* Fl. Ind. Bat. Suppl. I. 524. It will be noticed in the description I have given above that the midrib can hardly be called "acutangled," even at the tip, below it is distinctly rounded and often grooved. I believe I have seen it very commonly all over the low country of the Peninsula, but it very rarely is met with in flower and I have never seen fruit.

*Semecarpus glomerulatus,* n. sp.

Bark grey. Leaves obovate apex rounded base narrowed to the petiole, margin undulate, coriaceous glabrous above, beneath nerves and reticulations covered with short red hairs, nerves about 10 pairs, meeting in arches at the margin reticulations numerous and prominent visible on both surfaces but most elevated beneath 4-8 inches long 2½-5 wide petiole pubescent ¼-½ inch long thick. Panicle 8-12 inches long with numerous spreading branches 4 to 6 inches long, rachis closely valvety pubescent. Flowers in distant glomeruli very numerous $\frac{1}{10}$ inch across. Pedicels very short pubescent. Calyx shallow with 5 very short lobes, pubescent. Petals 5 glabrous ovate lanceolate subobtuse valvate. Stamens 5 filaments slender about as long as the petals glabrous. Disc broad flat fleshy hairy in the centre.

Lankawi: Pulau Nior Stali (Curtis 3681).

## SABIACEAE.

*Meliosma elegans*, n. sp.

A small tree 20 to 30 feet tall branches black when dry. Leaves unequally pinnate 6-8 inches long leaflets opposite 3-5 pairs, lanceolate acuminate base cuneate 2 inches long 1 inch wide glabrous except for a few fugacious reddish hairs on the petiolule and midrib, petiolule ¼ inch long. Panicle lax a foot long, with distant long slender branches 6 inches long or less branchlets 1-2 inches. Flowers subsessile small pink fragrant. Rachis everywhere covered with scattered red hairs. Calyx lobes narrow lanceolate obtuse 4 or occasionally 5 margins ciliate. Petals glabrous 5 outer ones orbicular, inner ones narrow oblong hooded. Stamens 3 glabrous, hooded with a bilobed rounded cup surrounding the anther. Pistil conic pubescent narrowing to a slender style. Fruit small pisiform with a low keel running on one side ¼ inch through.

Selangor: above the Gap, Gunong Semangkok 3-4000 feet alt. (Curtis 3754).

I cannot match this elegant plant with any described species.

*Meliosma monophylla*, n. sp.

Leaves simple elliptic acuminate with a rather long blunt point, narrowed to the base, thin in texture glabrous shinning, the nerves slender 7 pairs usually visible above meeting in arches near the margin, length 6 to 8 inches, width 3 to 3½ inches; petiole slender thickened at the base 1½ to 2 inches long. Panicles axillary or terminal 2 to 3 inches long with a slender peduncle about an inch long glabrous, branches few except in the terminal one, and short. Flowers $\frac{1}{10}$ inch long shortly pedicelled. Sepals 5 suborbicular, unequal, margins ciliate. Petals 5, three orbicular glabrous, 2 smaller irregular. Stamens 2 fertile. Anthers decurved with a rather wide connective 3 irregular sterile, lobed, adnate at the base to the petals. Ovary conic glabrous.

Perak: Hermitage Hill (Ridley) a single specimen collected in 1892.

Very distinct from any species known to me is its thin textured simple leaves and general glabrous habit, the flowers too are fewer and larger than usual.

## MELASTOMACEAE.

*Anerincleistus pauciflorus,* n. sp.

Much branched shrub about 6 feet tall, stems terete. Leaves elliptic ovate acuminate winged on the petiole glabrous above and beneath except a few hairs on the midrib, 7 inches long 3 inches wide, 5 nerved, with straight parallel transverse conspicuous nerves, petiole 1 inch long, winged in the upper part covered with rough pale hairs as are the young parts. Flowers 2 or 3 in a small raceme terminal on a very short peduncle. Bract hairy ovate acuminate obtuse $\frac{1}{4}$ inch long. Calyx lobes fleshy linear, hairy $\frac{1}{10}$ inch long. Petals ovate acute bright rose pink margins minutely ciliate. Stamens 8 equal and similar filament flat linear narrowed at tip glabrous pink. Anthers longer hardly sagittate base of cells rounded, acuminate upwards opening by terminal pores, glabrous with a pair of short processes or warts rising from the base of an oblong thickened connective. Style thick cylindric. Capsule $\frac{1}{4}$ inch long thickly roughly hairy splitting above into 8 linear lobes.

Selangor: Klang Gates almost out of flower, Aug. 1908.

A much bigger plant than *A. macranthus,* King, with hairy calyx tube and with the capsule valves splitting into 8 linear lobes. From *A. hirsutus,* Korthals, it differs in the very short inflorescence the large bract and the dehiscence, and larger more glabrous leaves.

*Ochthocharis ovalifolia,* n. sp.

A shrublet branched with pale bark young parts covered with dark red curly hairs. Leaves opposite ovate acute or acuminate base rounded, margin crenulate with short thorn-like processes, nerves 5 from the base, transverse bars conspicuous beneath above glabrous except on the midrib at the base, beneath pale, the nerves and reticulations covered with curly red wool, $1\frac{1}{2}$-$2\frac{1}{2}$ inches long $1\frac{1}{4}$ inch wide, petiole red woolly $\frac{1}{2}$ inch long or less. Panicle short terminal, with few short branches and few flowers, red woolly at the nodes. Bracts oblong $\frac{1}{10}$ inch long, glandular hairy. Calyx $\frac{1}{8}$ inch long, campanulate with short lanceolate triangular lobes, edged with gland tipped hairs. Corolla. Petals 5 lanceolate acuminate ending in a short hair-like mucro. Stamens 8 all similar filaments moderately stout, anthers as long linear oblong obtuse, with a solitary glandular boss at the base on the back. Ovary glabrous, style stout nearly as long as the petals, stigma capitate. Fruit capsular, subglobose, sepals ciliate, top hardly elevate nearly flat, dehiscence apparently irregular, $\frac{1}{5}$ inch long. Seeds numerous fawn colour cuneate truncate at the top, raphe thickened conspicuous.

Johore: in dense swampy woods at Sedenah Aug. 1908 (Ridley).

The normal number of stamens in this genus are 10 but I could only find 8 in the flower I examined. The plant was almost out of flower, at the time, and the flower might not be normal. The small usually ovate leaves closely toothed, small panicle, and rufous hairs on the young parts distinguish it from other species.

## BEGONIACEAE.

*Begonia paupercula,* King.

I have not seen the type of this species nor is there any record further than Perak as to where the original plant was obtained, but there is a small species of *Begonia* abundant at the Kwala Lumpur caves, which I think may be intended by this description. The plant however described from dried specimens only differs somewhat from King's description and thus I describe the Kwala Lumpur plant from the living plants brought from the caves, where it grows abundantly. A small succulent herb with a creeping not swollen rhizome, four to 6 inches tall; the stem pinkish, completely glabrous except for a few glandular hairs on the edges of young leaves, and some scattered processes, (trichomes) on the upper surface. Leaves ovate acuminate blunt cordate at the base unequally bilobed, nerves 5 to 7; 4 inches long $2\frac{1}{4}$ to 3 inches wide, polished light green, or in some plants darker with white spots, petiole 2 to 3 inches long pinkish. Peduncle 3 inches long, with a side branch and small leaf about halfway. Cyme terminal small, and few flowered. Bracts lanceolate white with red veins. Male flowers. Sepals 2 orbicular ovate obtuse, retuse or entire white with red nerves, $\frac{1}{4}$ inch long. Petals 2 smaller, spathulate white retuse. Staminal column globose. Anthers subglobose not apiculate. Female flower $\frac{1}{2}$ inch across. Sepals and petals 6 or 7 very unequal, 4 obovate white lined with red, the others narrower subspathulate white. Styles 2 separate from near the base yellow. Fruit with three unequal wings, two short one long oblong subtriangular blunt half an inch long.

On Limestone rocks Caves near Kwala Lumpur.

It will be noticed that King's *B. paupercula* differs in description in the absence of petals in the male, and apiculate stamens, and the larger number of perianth lobes in the female.

*Begonia clivalis,* n. sp.

Small succulent herb, with a short rhizome 4 to 8 inches tall. Stems red pubescent hairy, once or twice branched above. Leaves orbicular ovate to ovate cordate, lobes nearly equal, tip rounded thin textured, margin undulate with few short teeth, above and beneath covered with stellate hairs, main nerves 7, spreading from the leaf base 1-3 inches long, $\frac{3}{4}$ to 3 inches wide. Petiole $\frac{1}{10}$ -2 inches long, densely stellate hairy. Inflorescences 3, lax few flowered 2-4 inches long pubescent. Bracts lanceolate $\frac{1}{10}$ inch long. Male flowers on slender pedicels

½ inch long. Sepals 2 ovate rounded, ⅕ inch long. Petals 2 narrower and shorter obtuse linear oblong. Stamens in a globose head rather few. Anthers subglobose not apiculate. Female flowers sepals 2 oblong red. Petals nearly as large 2, white. Styles 3 separate nearly to base. Stigmas curved capitate. Fruit capsule red three winged, ¼ inch across, 2 wings short triangular, one longer triangular obtuse.

Selangor: Klang Gates on sandy banks, Aug. 1908 (No. 13523); Pahang track (Ridley 8591).

A pretty dwarf begonia with bright red stems and nerves of leaf, allied to *B. Forbesii*, King. The Pahang track plant is rather stouter and less hairy, but I think is the same.

## RUBIACEAE.

*Xanthophytum rupestre*, n. sp.

A little shrub about 6-8 inches tall branched stems slender light brown densely covered with long silky appressed, and somewhat felted hairs pale brown. Leaves obovate to ovate acuminate acute at both ends, subcoriaceous glabrous dull green above densely white felted beneath, nerves ten pairs prominent beneath, reticulations beneath conspicuous, 1-2 inches long ¾-1 inch wide petiole very short ⅛ inch long. Stipules as long as the petiole ovate acuminate. Inflorescences axillary, panicled of two branches, scorpioids. Flowers 10 in a panicle, all woolly. Pedicels very short peduncle none. Calyx lobes 5, triangular acute deep green. Corolla ¼ inch long white woolly hairy, tube narrow at base then abruptly dilated, lobes 5 short ovate mucronate, tube hairy both within and without. Stamens 5 included, adnate to the tube, with very short filaments. Anthers oblong yellow, with a short mucro at the tip. Style included, rather stout. Stigma oblong large, stigmatic surface yellow, capitate transversely grooved. All glabrous, disc annular black. Fruit ⅙ inch long cylindric-turbinate felted

2 celled, with numerous angular seeds on an axile placenta. Seeds reticulate dotted brown angular.

Loc. Selangor at Klang Gates, a quartzite dyke alt. 600 feet, flowering August 15, 1908 (Ridley No. 13414).

The genus *Xanthophytum* is based on a plant discovered in Java by Reinwardt and is allied, if indeed it can be considered distinct to *Lerchea* also a Javanese plant. There are two or three species of the genus recorded, one or two from Java, one from Borneo and one from the Society islands. I have seen none of these species, but this plant is evidently (from description) allied to *X. fruticulosum,* Miq. of Java. Its most important difference lies in the position of the stamens, which are not adnate to the base of the corolla, but in the mouth of the corolla. In this it most resembles *Lerchea.* But the whole habit of the plant is different from that genus and more resembles that of *Xanthophytum.*

The locality in which I found this curious little plant is of some interest. It consists of a large dyke of quartzite attaining a height of over 1000 feet above sea level. This altitude the short time at my disposal did not permit me to ascend, and the plant was actually gathered on a lower part of the ridge at about 600 feet above sea level. The ridge is of no great width at this point, and is precipitous on both sides. The soil is somewhat peaty and scanty, the rocks projecting bare in many parts. In the crevices of the rock the plant was growing. The whole ridge is very dry, and was exceptionally so at my visit as rain had not fallen for more than a week. Many of the trees and shrubs were out of flower, but the *Xanthophytum* was in good bloom. The lower part of the upper ridge was covered with bracken, *Pteris aquilina.* Above where the soil was more scanty was abundance of the grass *Eriachue Chinensis* very characteristic of dry spots. I saw no other grass there. *Boeckia frutescens* in flower, as a low shrub, was abundant. This is common at high altitudes in dry spots all over the Peninsula, usually at 3000 feet and upwards, and is stated to be a sea shore plant in Tringanu and near Sandakan. *Rhodoleia championi* was in fruit. This is also a mountain plant, which I have never seen at a lower altitude than 3000 feet. *Cibotium Barometz* and *Oleandra neriiformis* grew under the shade of this and other trees; the latter being also a characteristic fern of our higher hills at 3000 feet altitude. There were a number of other trees of stunted growth on the ridge, none of which were in flower or fruit, but they had all the facies of the trees and shrubs of such hills as Mt. Ophir, and Kedah Peak at 4000 feet elevation. The most conspicuous and abundant plant however was *Pogonanthera pulverulenta,* a common plant occurring as an epiphyte in the low country, in mangrove swamps, and on lofty trees in the forests and often establishing itself when fallen from a tree, on the ground in dry exposed spots and also met with on rocks and trees in the higher hills.

The flora of this ridge may therefore be considered truly xerophytic, and totally different from the flora of the Batu Caves limestone district at no great distance and from the forests of the Kwala Lumpur environs.

*Chasalia pubescens,* n. sps.

A bush about 5 feet tall much branched, stems soft glabrous when adult, lower internodes about 4 inches long. Leaves herbaceous lanceolate acuminate caudate narrowed to the base, primary nerves about 8 pairs looping within the margins, above glabrous beneath paler, sprinkled all over with pubescence, the keel, nerves, and petiole densely pubescent, 6-7 inches long, 2-2½ inch wide, petiole ¼-½ inch long. Stipules $\frac{1}{10}$ inch long ovate obtuse pubescent. Cyme compound dense, short 1 inch long, pubescent, pale rosy white. Flowers small sessile in small heads. Calyx short cup-shaped $\frac{1}{15}$ inch long with 5 short teeth; pubescent. Corolla $\frac{3}{10}$ inch long, pubescent except at the base tubular curved, lobes fleshy short, linear hooded obtuse, hairy outside glabrous within. Stamens 5 glabrous, anthers linear not cordate rather large, filaments short. Style slender bifid nearly to the base, ovary glabrous cylindric oblong depressed at the top, a little taller than the calyx lobes.

Johore: in woods at Sedenah, hardly out in Aug. 1908. The flowers are white the buds tinted at the tip with lilac.

This species is very distinct from *C. curviflora* in its pubescence and congested flower heads.

## ORCHIDEAE.

*Microstylis nemoralis,* n. sp.

Stem fleshy purple cylindric creeping ascending, 6 inches long. Leaves ovate acuminate, 4 to 9 red, base rounded, five nerved, 3 to 4 inches long, 2 inches wide. Raceme 5 inches tall, base nude, rachis angled, with a few 2 or 3 linear, narrow bracts ¼ inch long. Flowers ¼ inch across, fairly numerous, close together. Sepals elliptic broad rounded at the tip, strongly reticulate nerved when dry, lower ones broader than the upper ones. Petals linear obtuse narrow, all red. Lip orange-yellow, broad with broad rounded auricles, limb obovate rounded almost quadrate, apex broadest with two rounded angle-lobes, and 5 acute teeth between. Column small pale.

Johore: at Sedenah in wet mud between tree-roots, in a dense wet forest, August 1908.

A very distinct and pretty plant, with the elongate stem of *M. micrantha* but with much larger leaves and flowers. Among Scortechini's drawings is a pencil sketch of a *Microstylis* which I think is intended for this plant. It is labelled *M. plantaginea* by Sir Joseph Hooker, but is not what I take to be the plant he so named in the Flora of British India of which there is another drawing of Scortechini's so labelled.

*Liparis Brookesii,* n. sp.

Rhizome short, pseudobulbs ¾ inch long ¼ inch through at the base, subcylindric but base dilated, covered with loose pale ovate sheaths acute ribbed with 8 to 10 ribs. Leaf solitary lanceolate narrowed to the base 3½-4½ inches long 1 inch wide thin textured many nerved, acuminate. Scape lax flowered 1 foot long slender base nude for 4 inches except for 2 or 3 linear, acuminate bracts ¼ inch long. Flowers remote about 7. Bracts linear acuminate narrow ¼ inch long. Pedicel slender half an inch long. Sepals linear oblong ¼ by $\frac{1}{10}$ inch long obtuse. Petals very narrow linear. Lip orbicular entire margins minutely crenulate, half an inch long and wide, callus at the base oblong obtuse indented and excavate in the front so as to appear double. Whole flower pea green with a darker spot at base of lip. Column graceful ¼ inch long with rather long low wings.

Borneo: Sarawak on limestone rocks at Bidi (C. J. Brookes).

The nearest species to this plant is I think *Liparis tricallosa* Rchb. fil. of the Sulu Archipelago. It differs in its laxer spike coloring of the flowers and orbicular lip with the very different callus. The callus is rather difficult to describe. It has the appearance of being formed by two portions of nerves picked up into a short elevated part, with a depression in front where the veins had begun to bifurcate.

*Dendrobium (§ Desmotrichum) crenicristatum,* n. sp.

Branches fairly stout $\frac{1}{10}$ inch through, internodes an inch long yellowish green, pseudobulbs linear oblong flattened grooved yellowish green 3 inches long, ⅖ inch wide, leaf lanceolate, 8 inches long 1½ inch wide coriaceous. Bracts lanceolate acute papery ¼ inch long. Pedicel slender. Sepals reddish ¼ inch long lanceolate acuminate acute mentum horizontal cylindric acuminate yellow half an inch long. Petals narrow lanceolate acuminate acute. Lip base narrow linear, lateral lobes decurrent free, points short triangular lanceolate; midlobe, claw very short, limb dilated oblong ovate subacute, margins undulate and crenulate, with short rounded lobules; keels 2 running from the tip base to the apex nearly as tall as the side lobes, straight to the midlobe where they are strongly undulate; base of lip pink, limb apricot colored. Column rather tall, with broad pale wings flanking the stigma, anther quadrate large.

Borneo: Sarawak, Quop (Hewitt).

Most nearly allied to *D. roseo-punctum* Ridl. rather conspicuous for the long mentum, and the broad stelidia.

*Dendrobium Lankaviense,* n. sp.

A slender plant with a tuft of slender stems, thickening slightly upwards, and often branched, above 8 inches long and as thick as a crowquill, red when young, and grey when old, lower internodes an inch long. Leaves narrow lanceolate acuminate acute, 1½ inches long, ¼ inch wide. Flower solitary from the nude stem, on a pedicel of half an inch long covered porrect. Sepals ovate lanceolate obtuse ½ inch long, ⅕ inch wide; mentum curved slender acuminate blunt little more than half an inch long. Petals elliptic obtuse a little broader than the sepals ¼ inch across, all rosy mauve. Lip entire obovate oblong, spathulate retuse claw narrow nearly ½ inch long, base of lip and claw white with a patch of pink dots in the centre, limb bright mauve. Column mauve, wings near the stigma thickened undulate. Stelidia small ovate obtuse. Anther rounded skull-shaped rounded in front, mauve.

Lankawi islands, sent by Mr. Fox, and flowered in the Botanic Gardens Singapore in October, 1908.

This pretty little plant is allied to *D. Eoum* Ridl. and *D. hymenanthum* Hook. fil. From the latter it differs in its narrower petals and sepals shorter and more slender stems and in the colour of its flowers.

*Bulbophyllum (§ Sestochilus) Hewittii,* n. sp.

Rhizome rather slender ⅒ inch through, pseudobulbs narrow cylindric 2 inches apart 2 inches long. Leaf lanceolate acute narrowed a little at the base 5-6 inches long 1½-2 inches wide, thinly coriaceous. Peduncles slender 5 inches long, with 1 or two sheaths below, one flowered. Bract ¼ inch long oblong cuspidate. Flower large. Upper sepal lanceolate caudate 1½ inches long ¼ inch wide, lower ones similar 2 inches long, rather wider than upper one, mentum about half an inch long rounded. Petals lanceolate long caudate an inch long. Lip large fleshy half an inch long. Ovate acuminate cuspidate base deeply cordate with rounded lobes. Column broad thick squared, stelidia large triangular. Anther ovate hardly beaked crested with a papillose ridge.

Sarawak: Mt. Poe (J. Hewitt).

Allied to *B. galbinum,* Ridl. but one flowered and with a very different lip and more caudate petals. The color is not given but the lip has some purple in the centre and as the color of the dry flower is pale it is probably yellow.

*Bulbophyllum (§ Cirrhopetalum) ruficaudatum,* n. sp.

Rhizome slender with many roots, pseudobulbs very small subcylindric ⅛ inch long half an inch apart. Leaf fleshy elliptic, obtuse 1½ inches long ½ inch wide narrowed at the base into a short thick petiole 1/01 inch long. Scape very slender, filiform 5 inches long with a few scattered sheaths. Flowers 6 in a half whorl, red. Bracts lanceolate acuminate 1/20 inch long, red, pedicles very slender twice as long. Upper sepal ovate cuspidate caudate with a filiform point margins ciliate, lower sepals very narrow linear free nearly to the base red over half an inch long. Petals lanceolate acuminate brown ciliate nearly as long as the upper sepals. Lip yellow fleshy papillose lanceolate acute, base emarginate, and sides elevated leaving a groove at the basal part. Column short with small setaceous stelidia.

Sarawak: Kuching (Hewitt).

Allied to *B. psittacoides,* Ridl., but with different pseudobulbs, and setaceous stelidia.

*Eria* (§ *Bractescentes*) *aurantiaca,* n. sp.

Pseudobulbs cylindrical thick green 1-2 inches long an inch or more through, when dry and flattened ovoid. Leaves 2 or 3 coriaceous linear oblong deep green 2-5 inches long ½ inch wide, obtuse. Raceme erect 3-5 inches long, many flowered. Bracts linear oblong persistent lower ones ½ inch long orange. Flowers about 12, orange color, pedicels slender half an inch long. Sepals narrowly lanceolate acuminate ½ inch long, lower ones broader at the base with a short broad mentum as long as the ovary. Petals linear acuminate shorter and narrower than the upper sepal. Lip narrower shorter, side lobes rounded oblong obtuse, disc narrow with three strongly elevated undulate keels, the centre one lowest till near the base of the midlobe when it becomes thicker and taller, midlobe longer than sidelobes fleshy ovate oblong obtuse, entirely covered with sinuate keels and warty protuberances. Column short. Clinandrum with wide thin margins. Anthers large elliptic thin obtuse, divided into two thinwalled cells with a ridge in the middle.

Sarawak: Kuching (Haviland) and Moulton (1909).

A very distinct plant of the Bractescens series in its completely orange colour and its curious lip.

*Coelogyne* (§ *Chelonostele*) *phaiostele*, n. sp.

Pseudobulbs crowded, flattened curved narrowed upwards, elongate many ridged, yellow or greenish yellow, 2 inches long, ¾ inch wide at the base, ¼ inch at the top, hardly half an inch through. Leaves 2 lanceolate 8 inches long 1 inch wide gradually narrowed into the petiole apex acute, slightly coriaceous dark green, when young the edges keel, and 2 veins red, petiole yellow terete 4 inches long. Leaves when young enclosed in 4 lanceolate flesh colored sheaths at the base. Scape from between the leaves 12 inches long subterete, raceme 2 inches or more, joints flexuous. Bracts lanceolate pinkish subacute half an inch long, flattened distichous. Flower small pedicel about ½ inch slender. Sepals ovate lanceolate obtuse ¼ inch long white, with a pale green medium vein outside and speckled with ocreous scales. Petals narrow linear as long. Lip little longer than sepals, pandurate, side lobes linear falcate short, midlobe rotundate bilobed, base narrowed, all yellowish white, two low ridges running from the upper angles of the lip to the centre of the midlobe. Column deep mahogany brown, foot green forming with the base of the lip a sac, the mouth partly covered with the sideflaps. Stelidia rather long linear curved, crest (margin of clinandrium) rather tall rounded crenulate, with 2 longer processes at the sides. Anther cap broad triangular flat yellow, beak short upcurved. Rostellum tooth-like. Stigma large orbicular.

A living plant in flower of this was brought me in June 1909 by Mr. Lewis who obtained it from Mt. Poe in Sarawak, Borneo. What appears to be identical was obtained by Mr. Hewitt on Santubong Mountain, and by Dr. Haviland in the same place. In Mr. Hewitt's plants the raceme has fully developed to a length of over a foot long and closely flexuous. He describes the sepals as light red brown. Column similar but deeper. Petals and lip pale yellow. I am not sure that the saccate portion at the base of the lip does not rather belong to the lip than to the column foot it is difficult to see where the column-base ends and the lip begins.

This plant would doubtless have been referred by Pfitzer to his genus *Chelonostele* but it seems almost impossible to break up the genus *Caelogyne* in the way he has done with any satisfaction. His genera run into each other with so many connecting links.

*Saccolabium fimbriatum*, n. sp.

Stem moderately stout over three inches long. Leaves linear lorate retuse with subacute points and a short mucro between 6 inches long, half an inch wide coriaceous-fleshy pale green. Raceme slender 5 inches long, base nude flowers few about 6 distant small. Pedicels slender $\frac{1}{4}$ inch long. Bracts very short ovate obtuse. Sepals elliptic obtuse $\frac{1}{10}$ inch long, apices rounded, yellow with a brown central line. Petals elliptic subacute similarly colored. Lip trilobed side lobes broad rounded oval, margins crisped yellow with a brown centre, midlobe linear narrow channelled, apex decurved with short yellow processes pink, upper callus decurved tooth-like, spur curved cylindric as long as the lip, half portioned. Column broad stout with a broad shallow clinandrium and broad blunt stelidia. Anther ovate beaked, distinctly 2 celled. Pollinia semi-globose on a long curved club-shaped pedicel, disc very small, rounded. Rostellar lobes short rounded. Capsule oblong linear triquetrous $\frac{3}{4}$ inch long $\frac{1}{5}$ inch wide.

Sarawak at Quop (Hewitt Oct. 1908 No. 104).

Nearest to *S. rostellatum*, Ridl. in habit but very peculiar in the lip fringed with short yellow processes both on the side and midlobes. The pedicel of the pollinia is longer than usual and rib-shaped.

*Saccolabium adenoncoides*, n. sp.

Stem curved 4 inches long. The leaves about nine very fleshy linear acute grooved above shining dark green $1\frac{1}{2}$ inches long $\frac{1}{10}$ inch through (when dry). Sheaths transversely rugose. Flowers small solitary dull yellow green, axillary with a few ovate bracts on the short peduncle, which is $\frac{1}{10}$ inch long rather thick and angled. Sepals lanceolate narrow subacute. Petals narrower. Lip entire saccate cup-shaped with a short acute beak, and a ridge running down from it outside. Capsule elliptic $\frac{1}{4}$ inch long.

Borneo: Kuching, and Quop (Hewitt).

This has just the appearance of *Adenoucos virens*, Bl. at first, but the lip instead of being flat is saccate, much the form of *Saccolabium minimiflorum*, Hook. fil. with which the plant appears to be allied. It really seems a connecting link between the two genera *Saccolabium* and *Adenoncos*.

*Sarcochilus anceps*, n. sp.

Stems pendulous over a foot long flattened ancipitous. Leaves coriaceous $2\frac{1}{2}$ inches long, $\frac{3}{4}$ inch wide oblong obtuse keeled, sheaths flattened sharp edged at the back an inch long. Racemes shorter than the leaves, extruded from the base of the leaf, peduncle 1 inch long, solitary or in pairs. Flowers three or four on a slightly thickened rachis. Bracts very small appressed ovate. Pedicels half an inch. Sepals ovate obtuse $\frac{1}{2}$ inch long $\frac{1}{5}$ inch wide, upper one narrower oblong obtuse. Petals shorter oblong ovate $\frac{1}{3}$ inch long. All reddish flesh color (salmon color). Lip shorter and smaller $\frac{1}{5}$ inch long base slightly saccate, side lobes as long as the whole lip falcate acuminate, midlobe rounded with a retuse boss at its base, base of side lobes and apex of lip scarlet, passing into yellowish red towards base of lip, with two red spots at the base inside, tip of side lobes white. Column white short with a foot nearly as long. Anther small orbicular ovate with a minute beak. Clinandrium shallow, rostellum very short. Pollinia 4 lobed, upper lobe elliptic, lower smaller, pedicel small cuneate, disc minute ovoid.

Johore: Tebrau River fl. H. B. S. Feb. 1909.

A very distinct and pretty plant very unlike any other *Sarcochilus* in the flattened stem, and salmon colored flower with bright red lip. It flowered in the Botanic Gardens, Singapore.

*Dendrocolla multicolor,* n. sp.

Stem short 1 inch long. Leaves about 5 terete subacute 4 inches long, $\frac{1}{10}$ inch through dark green. Scapes slender purple 2-4 inches long including raceme, which is thickened and 1 inch long. Bracts crowded short fleshy ovate blunt boat-shaped green. Pedicel slender purple nearly half an inch long. Sepals orange colour oblong spathulate narrowed at the base $\frac{1}{8}$ inch long. Petals obovate oblong, apex rounded orange with pink spots. Lip orbicular spathulate with a linear claw, and orbicular obovate limb rounded entire orange with red spots flat, calli violet large, two fleshy linear, obtuse, and two central smaller claw violet with two orange bands. Column tall orange oblong deeply channelled in front. Anther whitish deeply lobed on the top, broad very shortly beaked. Pollinia ovoid pedicel broad and short square, disc small linear. Capsule linear sausage-shaped 1 inch long, $\frac{1}{8}$ inch through.

Borneo: Sarawak, Kuching (Hewitt Oct. 08).

This species is most nearly allied to *D. fulgens*, Ridl.

*Dendrocolla pulchella*, n. sp.

Stem very short hardly half an inch long. Leaves 4 fleshy oblong obtuse purple about half an inch long, a quarter of an inch wide. Scape slender 1½ inch long purple. Spike ¼ inch long terete with ovate acuminate acute recurved bracts dark purple. Flower ⅕ inch across pedicel short. Sepals ovate subacute broad deep purple.' Petals oblong obtuse connivent with the upper sepal deep purple. Lip bright yellow sac rather long obtuse, side-lobes broad rounded, between them at the apex a dense mass of clubbed white hairs, running up on the disc on a broad flat keel. Anther cup round retuse in front white, pollinia semi-elliptic on an ovate disc. Column rather long for the genus widening downwards. Capsule linear an inch long.

Borneo: Sarawak, Kuching (Hewitt) fl. Sept. 08.

A very small species allied to *D. trichoglottis* but with smaller deep colored flowers.

*Habenaria Hewittii*, n. sp.

Stem 2 feet tall leafy. Leaves oblanceolate acuminate glabrous narrowed to the base, many nerved, margin minutely undulate 12 inches long 2½ inches wide, upper sheating leaves lanceolate, acuminate subulate over an inch long. Raceme lax about 14 flowered. Bracts lanceolate cuspidate half an inch long, $\frac{1}{10}$ inch wide. Ovary and pedicel 1 inch long. Upper sepal galeate ¼ inch long. Lower sepals ovate falcate deflexed. Petals linear narrow. Lip trifid to near the base with three linear lobes obtuse subequal longer than the sepals, spur slender clubbed towards the apex half the length of the ovary. Column processes long.

Borneo: Sarawak (Hewitt 1908). There is no special locality given with the single specimen.

This plant seems to be most nearly allied to *H. salaccensis*, Lindl. of Java, and is the biggest *Habenaria* I have seen from Borneo.

## SCITAMINEAE.

*Globba (Ceratanthera) debilis,* n. sp.

Stem slender, whole plant 2 feet tall. Basal sheaths spotted with violet. Leaves narrow lanceolate acuminate cuspidate glabrous, nearly $\frac{1}{2}$ inch wide about 8 in number, ligule short fringed with hairs. Panicle very slender and weak with 7 or 8 short, 1 flowered branches, $\frac{1}{4}$ inch long. Bracts very small lanceolate acuminate. Calyx tube short turbinate 3 lobed, lobes mucronate; $\frac{1}{10}$ inch long. Corolla tube twice as long, lobes ovate rounded obtuse, upper one hooded, bright orange, as long as the tube. Staminodes narrow linear oblong paler. Lip short obovate apex rounded shortly bilobed, or retuse yellow with a brown central spot. Filament $\frac{3}{4}$ inch long, anther cells elliptic, with a single subulate spur at the base as long as the ovary.

Borneo: Sambas River, Keelong (Brookes).

Near *G. panicoides* Miq. in some points and in general appearance, but the short round lip and the long slender spurs from the very base of the anther make it very distinct from any species known to me.

*Gastrochilus violaceus,* n. sp.

Leaves 2 or 3 together, rather fleshy smooth dull dark green above, central line pale beneath pale, nerves inconspicuous 3 to 5 inches long $1\frac{1}{2}$ inches wide, ovate obtuse, petiole 1 inch long. Spike short of many flowers, from the leaf axil, 1 inch long subsessile. Bracts lanceolate acuminate. Bracteole lanceolate acuminate with a long point $\frac{3}{4}$ inch long glabrous thin. Calyx tubular with 2 long acute teeth $\frac{3}{8}$ inch long white. Corolla tube cylindric slender creamy white $\frac{3}{8}$ inch long, lobes narrow lanceolate acute white $\frac{1}{4}$ inch long. Staminodes erect little more than half as long linear subacute broader than the petals. Lip spathulate claw with sides raised linear, limb obovate oblong emarginate little more than half an inch long and $\frac{3}{10}$ inch wide, violet with a central-primrose yellow bar, edged with minute glandular hairs as are the staminodes. Stamen white half as long as the dorsal sepal, filament broad pubescent. Anther short oblong, crest very short truncate obscurely 3 toothed shorter than the style.

Cultivated in the Botanic Gardens, Singapore from plants supplied by T. D. Pereira, Fl. Oct. 1908. It is believed to be from Padang, Sumatra. Something of the habit of a *Kaempferia* with flowers of *Gastrochilus.* The violet coloring of the lip is unusual in that genus.

*Gaströchilus hirtus,* n. sp.

Stem short covered with hairy sheaths. Leaves 2 obovate oblanceolate subobtuse mucronulate, much narrowed to the base 6-7 inches long 2 inches wide, about 6 pairs of nerves conspicuous glabrous petiole and sheath 3 inches long hairy densely. Spike central, subcylindric thick 2 inches long. Bracts lanceolate cuspidate with long acuminate points thickly hairy. Floral bracts lanceolate cuspidate 1 inch long densely hairy. Calyx $\frac{1}{2}$ inch long ribbed hairy. Corolla white, tube slender cylindric over an inch long hairy, lobes lanceolate obtuse $\frac{1}{4}$ inch long hairy. Staminodes narrower acute. Lip hardly longer oblong obovate entire apex truncate, shortly toothed. Stamen crest ovate rather small, entire.

Borneo: Sarawak, Tiang Layu (J. Hewitt).

"Flowers pale white, lip with some red centrally." Nearest perhaps to *G. Curtisii,* Bak., but the flowers are much smaller.

*Gastrochilus bractescens,* n. sp.

Stem woody creeping with long wiry roots. Leaves numerous lanceolate long petioled, obtuse acuminate at the base, blade 5 inches long 1 inch across, petiole 3 inches long, base 2 inches sheathing with a narrow sheath margin. Inflorescences axillary on erect peduncles 1 inch long, at first obcuneate 1 inch long of 4 branches each half an inch long subtended by convolute lanceate obtuse bracts. Bracts at length spreading an inch long $\frac{1}{3}$ inch wide, enclosing the spikes. Flowers numerous in the spikes small white. Bract to spike oblong obtuse ribbed. Floral bracts small. Calyx tubular rather thick 3 lobed lobes short obtuse, split shortly on one side as long as the corolla tube $\frac{1}{5}$ inch long. Corolla tube thick, lobes linear oblong obtuse longer than the tube. Staminodes narrower linear oblong. Lip short obovate more fleshy entire. Anther linear oblong with a quadrate crest 3 toothed shortly at the tip.

Borneo: Lundu (Foxworthy 42).

*Zingiber flavidus,* n. sp.

Stem slender 2 feet tall. Leaves remote ovate lanceolate acuminate glabrous thin narrowed at the base a very little 4 inches long $1\frac{1}{4}$ inches wide, hardly petioled, ligule very small truncate, sheath narrow. Inflorescences radical. Peduncle slender 6 inches tall $\frac{1}{5}$ inch through covered with elongate sheaths glabrous. Spike fusiform acuminate 3 inches long, all yellow. Bracts oblong rounded at the tip, 1 inch long half an inch wide, striate glabrous. Bracteole lanceolate linear obtuse $1\frac{1}{2}$ inches long by $\frac{1}{10}$ inch wide, hairy. Calyx spathaceous, hairy, apex rounded blunt. Corolla tube slender, 1 inch long lobes lanceolate acute, $\frac{1}{2}$ inch long. Lip lanceolate acute entire bright yellow. Anther elliptic broad fawn color, beak shorter.

Sarawak: Quop (Oct. 1907) (J. Hewitt).

Allied to *Z. gracilis* but with yellow bracts.

*Alpinia* (§ *Cenolophon*) *microlophon,* n. sp.

Leaves lanceolate caudate, base acuminate softly hispid on both surfaces, more densely on the midrib on both sides and the edges, 13 inches long $2\frac{3}{4}$ inches wide petiole $\frac{1}{4}$ to nearly 1 inch long, ligule lanceolate obtuse half an inch long, hairy (glabrescent in older leaves) sheath reticulate nearly glabrous. Panicle 4 inches long (or more, incomplete) densely roughly yellow hairy, branches short 2-3 flowered hairy, $\frac{1}{2}$ inch long. Bracts spathaceous hairy, with a three lobed limb, lobes short tooth-like. Calyx shorter, $\frac{1}{2}$ inch long goblet shaped, base narrowed gradually dilated upwards, very shortly 3 lobed with rounded lobes, all hairy. Corolla tube rather slender

$\frac{3}{4}$ inch long, hairy lobes oblong obtuse $\frac{1}{2}$ inch long $\frac{1}{4}$ inch wide hairy outside glabrous within. Lip $\frac{1}{2}$ an inch long, base narrow, thin widely obovate rounded, margins undulate crisped, nearly $\frac{1}{2}$ inch across. Staminodes $\frac{1}{10}$ inch long oblong truncate shortly 2 toothed. Stamen longer than the lip, filament thin flat. Anther thick and fleshy with two thick pustular ridges along the back, connective prolonged into a short thin oblong crest with three short teeth. Style a little longer, stigma cup-shaped.

Sarawak: Upper Sarawak River (Sept. 08, C. J. Brookes).

" White red streaks and blotches." A curious species in its very hairy panicle and petals, and broad lip. The thick ridges on the back of the stamen are also unusual.

*Donax parviflora,* n. sp.

Stems rather short. Leaves ovate acute often inæquilateral 3-6 inches long $2\frac{1}{2}$ to 4 inches wide glabrous except for a fringe of long hairs along the midrib on the back on each side, nerves very close and conspicuous when dry. Inflorescence short, branches few 3 to 6 inches long pendulous, slender hairy, especially on the nodes. Bracts linear lanceolate acuminate ribbed $\frac{1}{2}$-1 inch long, sparsely hairy. Flowers very small white. Ovary small silky hairy. Calyx lobes lanceolate $\frac{1}{10}$ inch long glabrous not ribbed. Corolla tube half as long, lobes lanceolate subacute 5 nerved $\frac{1}{5}$ inch long. Staminal tube short, outer staminodes narrower linear oblong. Lip oblong truncate margin crisped, keel triangular large. Stamen linear with the anther on the edge, connective not prolonged. Cucullus broad hatchet-shaped lobed. Fruit globose, hairy with few scattered hairs, seeds 2, $\frac{1}{5}$ inch long, inner face flat, outer one convex curiously warted, with five rows of 4 rounded bosses, with a depression round each.

Perak: at Ipoh (Ridley 11931); Pahang: Kwala Tembeling (Ridley 2402), Pulau Tawar (2401) and Pasir Loyang all on the Pahang river; Selangor: Woods at the base of the Batu Caves, flowering in August.

This the fifth species of this genus, is distinguished by the small size of the flowers, the extremely short corolla tube only parallelled in *D. virgata* of Ceylon and the two seeded fruit.

Schumann in *Actoplanes Ridleyi* describes the fruit of that species exactly like the fruit of *D. parviflora,* but the rest of his description applies to *Donax grandis* which has only one globose smooth seed.

In habit the plant resembles *D. grandis* but is very much smaller rarely attaining a height of six feet, and with smaller leaves, and shorter erect or suberect panicle, and the flowers are much smaller with a shorter tube.

*Stachyphrynium parvum,* Ridl. In describing the little *Stachyphrynium minus* in the Materials for a flora of the Malay Peninsula (monocotyledons) II. 59, I overlooked the fact that the specific name had already been used, for a Siamese species described by Schumann in the Pflanzenreich, I therefore substitute the name *Stachyphrynium parvum* for it.

I found the plant in immense abundance in Sedenah forests in Johore in August covering the ground thickly in large masses, but there were no signs of flowers or even of inflorescence.

## PALMAE.

*Pinanga arudinacea,* n. sp.

Stems tufted, several together on a short rhizome elevated on stilt-roots four feet in height, $\frac{1}{8}$ inch thick, the internodes an inch long, rings narrow elevated. Leaves simple bilobed with widely divaricate lobes seven inches long, 2 inches wide, acuminate, or (lower leaves) three to four lobed, lobes $\frac{3}{4}$ inch across, linear acuminate; petiole 3 inches long, sheaths slightly swollen, purplish. Inflorescence from the axils of fallen leaves patent. Spathe linear oblong, boat-shaped mucronulate 2 inches long. Compound spike 3 inches long with three or four spreading branches, the middle one the longest. Rachis terete red. Flowers cream-white in distant pairs or solitary spirally arranged $\frac{1}{8}$ inch long. Male flowers. Sepals short ovate, blunt. Petals ovate fleshy obtuse. Stamens 6. Anthers elliptic broad narrowed upwards white, filaments very short. A central tumour represents the abortive pistil. Female flowers. Fruit globose half an inch through scarlet crowned with a small circular stigma, pulp thick tasteless. Seed $\frac{1}{2}$ inch long, $\frac{1}{6}$ inch through fusiform, narrowed more to the base, light brown with numerous close longitudinal ribs.

The specimen from which this pretty palm was described was given to me some years ago by Bishop Hose who had had it in his garden for some years. He procured the plant at Lundu it is believed, in Sarawak, Borneo. It flowered on being planted in a shady place in September 1908, and set fruit in the following February. It is perhaps most remarkable for its globular fruit and narrow fusiform seed.

## AROIDEAE.

*Cryptocoryne minima*, n. sp.

A very small plant with a rather stout root stock an inch long emitting copious roots, and stolons. Leaves ovate to ovate lanceolate subacute base broad rounded not cordate 1 to $1\frac{1}{2}$ inch long $\frac{3}{4}$ to 1 inch wide, dull green bullate above purple beneath, petiole 2-$2\frac{1}{4}$ inches long, sheathing at base. Spathe sessile very small tube dilate at base, then cylindric slightly narrowed white $\frac{1}{2}$ inch long, limb ovate oblong $\frac{1}{4}$ inch long dull yellow spotted with brown. Capsule obovoid purple half an inch long.

Perak: at Tapah, in a muddy patch by the tin mine, covering the mud with its prostrate leaves.

This very small species is remarkable for the minute, curiously spotted spathes which is very difficult to see. It was only by hunting over the patch plant by plant that it was possible to find them. The fruit is really larger than the spathe and borne on a slightly longer pedicel, that of the spathe being so short that it is almost sessile, I know no species as small as this little plant.

# A Letter of Instructions from the East Indian Company to its Agent, circ. 1614.

With Notes by W. G. MAXWELL.

Among the Cottonian manuscripts in the British Museum is a letter of instructions from the East India Company to its principal agent in the East India.

The manuscript consists of nineteen pages and is registered as "Cottonian Manuscript, Otho E. VIII. ff. 231-240 (ink foliation)." There is no date to the letter, but Mr. W. Noel Sainsbury the editor of the "Calendar of State Papers, Colonial Series, East Indies, China and Japan 1513-1616" assigns to it, with a query, the date 1614. In this case the addressee would be John Jourdain, who was in that year the East India Company's principal agent in the East and who resided at Bantam, some sixty miles north of the present city of Batavia.

It will be noticed that in the manuscript there is a reference to the date 1620 as the date of Raja Api's death. This, if correct, would of course make the date suggested by Mr. Sainsbury impossible. I think however that there can be no doubt that 1620 is a slip of the pen for 1610. In one of the notes which I have appended to this article, I show that the account of Raja Api is identical with that given by Peter Williamson Floris, who gives the date as 1610. Floris was one of the merchants of the company's seventh voyage in 1611, and the writer of this letter [which gives such "descriptions and intelligences as he has been able to gather from the advises given by the company's factors"] almost certainly had Floris' letter before him.

This manuscript was partially destroyed by fire in 1731, some three lines being consumed at the head of each leaf. The recurring omissions in the transcript mark the places.

The thanks of the Society are due to Mr. G. F. Warner, Keeper of Manuscripts, for permission to take a copy of this letter which is now for the first time published.

I have prepared some brief notes of the places, people and things specified in the letter. These are given in alphabetical order in an appendix.

This manuscript appears to me to be interesting in two respects ; firstly not so much on account of its contents as for its purport to contain all that was then known in England of this part of the world. Indeed when one sees that the letter was written in 1614, more than a century after the Portuguese had been in occupation of Goa and Malacca, it seems astounding that the Directors of the East India Company (which had been founded some fourteen years before the date of this letter) should have so little information to give their principal agent in the East. The reason that there is no reference to Goa, Malacca or any other Portuguese possession is, of course, that the British could not trade there.

The document is interesting in a second respect as showing how small a place in the early aims of the Honourable East India Company, India itself occupied. In later years the Company so much confined itself to India that one is apt to think of India and the Company as co-extensive.

But India at one time stood for nearly everything outside Europe, Africa, and Asia Minor. Thus Marco Polo wrote (A. D. 1298). " India the greater is that which extends from Maabar to Kesmacoran (i.e. from Coromandel to Mekran) and it contains thirteen great Kingdoms. India the Lesser extends from the province of Champa to Mutfili (i.e. from Cochin-China to the Kistna Delta). Abash (Abyssinia) is a very great province and you must know that it constitutes the Middle India."

To this day each country calls by the name of India that part of this vast area that it has acquired for itself : thus India to us means British India, to the French it means Pondicherry, to the Portuguese it means Goa, and to the Dutch it means the magnificent possession of Netherlands-India. The West Indies were so called because Columbus imagined that he had discovered a new route to the " Indias " by sailing West instead of

East; and the word "Indian," of which "Red Indian" is the best known form, has been applied (so it is said) by discoverers to almost every tribe from the Esquimaux to the Patagonians.

Of course one knows, but perhaps hardly realizes, that when the East India Company started operations it did not own a foot of land in India. It was really the task of making India British that withdrew the operations of the East India Company from the vast area of the East India, with which it first set out to trade, to the comparatively restricted area of British India.

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## [British Museum. Cotton. MS. Otho E. VIII, ff. 131-240 (ink foliation.)

N.B. The MS. was burned in the fire of 1731—possibly about three lines at the head of each leaf being consumed—hence the recurring omissions in this transcript.]

..........................ecting thereof, advised you to goe (?) ............you may from place to place for the......... thereof: Wee have since Notwithstanding [f]allen (3) into the consideration of the great want wee shall contynuallie haue of your presence in the places where most of our shippes are to be laden and where you shall thinck it most convenient to settle the place for our principall Rendeuowes which wee still perswade our selues wilbee Jacatra whither all our shippes both from England and elswhere should touch and take from you their directions, to bee ymployed vnto such places as shall seeme best vnto you, by advise you shall receaue from our other ffactories adviseing them what returnes you desire, aswell for England as for other places and ffactories abroade to whose commaund with the advise of your Counsell both our Captaines and ffactors shalbee subiect vnto; both for staying, remooveing or settling in such place and places as you and your Councell shall appoinct that by emulation one with annother they may by their industrie, discouer the Trade, giue you large information, redress such euill Custome as they finde gather goodes together to dispatch the shippes richly and speedilie to you againe to looke yt their charges beenot excessiue and that they send their accompts and Copies of their Bookes orderlie vnto you contynuallie, where wee wishe you to haue a speciall Care for the pervseing Comptrolling or allowing of the accompts and soo post them ouer vnto your generall bookes. And as often as you shall thinck itt expedient, that the Factor himself come to giue vpp his said Accompts ffrom which place of Jacatra or Banta both for your healthes sake as otherwise wee would not haue you goe vnles itt were for some extraordinarie and waightie occasion and so allowed by your Councell: ffor by the Contynuall coming of our shippes from England, of the Pinnaces from the Indies, and the giueing good orders for goodes to bee in a readines for the reladeing of our shippes in tyme for all places you shall......... ...............from you that............nd not finding the gouerment as it ought.........take order therein, either remooueing such......psons, and putting others in their places, or ells to redresse their faults according as the matter requireth, of which his proceeding hee is afterwards to make an vpright report to you, whereby you may bee of all thinges well Informed, both in the poinct of Trade, the Charges gouerment, and all other matters, and by your good care, industrie with mildnes, keepe all in subiection. Likewise that you hereby may take Care ouer the victualls and provizions of our shippes that come out and goe for England, to take accompts of them howe the same is spent and what may bee spared to take a shoare for the provizion of other shippes and the Pinnaces that tarrie in the Countrie.

And for the better gouerment of all the ffactories we hould itt fitt you Choose four principall places where the cheife persons ought to bee resident vizt.

Surratt, Coromandell, Bantam, Patania, to which principall persons in those foure places you may giue Name of Agents, Directors Consulles or such like. The gouerment of him in Surratt should stretch ouer all the Countrie of the great Mogore as Surratt it self Cambaia, Barocha, Amadanar, Agra, Lahor and the places thereaboutes. Hee of Coromandell should haue commaund ouer those ffactores that shalbee planted in Narsinga.

Hee of Bantam should haue his commaund ouer Sumatra Jaua Succadana Macassar vnto the Mulluccos.

And the commaund of him at Patania to stretch ouer Siam, Camboja, Cochin-china, Japan, Bernee and the places thereaboutes, And if a ffactor bee also to bee planted at Mocha, there likewise to be a cheife head, which aforesaid Directors may haue the highest commaund as your Liutenantes.......................tuall env (?)...... [a] nd..............send any shipp or Capitall···············places to consigne the same to the.........who shall give a receept thereof and dispose...... thereof amongst the Factories that are under hym, according as hee shall finde requesite for euerie perticuler place, and you to advise the said Director what goodes you desire for your returne and they to take order for the same where it is to bee had.

And if any of the ffactories stand in need of any thing, they shall Certifye the same to their respectiue Directors, and if hee cannott help them thereto, the said Director to advise the same vnto you, and you to giue Order vnto such other Directors vnder whose gouerment the said commodities are to bee had to provide the same.

So likewise if any faults bee committed, that ye goodes bee not as they ought, or otherwise bee not well Condytioned, to Certifye the same presentlie one to annother, to have such faults amended.

Moreouer wee thinck itt requesite for your more ease that euerie ffactorie shall give accompt vnto such Directors as are ouer them, and the Director to keepe generall bookes, whereby hee may see the estate of eche ffactorie, To which ende euerie Director is to haue a Bookekeeper ioyned with him as a Secretarie whereby the generall Bookekeeper ouer the Indies resident with you may bee eased of a greate trouble, and many errors and mistakeinges prevented, all places provided with principall heades, your aucthoritie kept in reputation and the whole estate to be euerie yeare sett and sent vs in Ballance and thereby the gaine & losse which euerie place yeildeth will presentlie bee found out, and so accordinglie remeadie provided for the same.

Neither doo wee thinck itt fitt, that the Directors should bee bound to keepe their residence in one place, but to bee in their power to visit their ffactories vnder them, from place to place to prevent all............................vise An...............shall come vnto you wee w...............spectes according to their estate, and ha......places and voices amongst your Counsell.

Moreouer we hould it convenient that euerie Direct...... haue 4. or 5. of the best experienced to ymploy in the ffactories that are vnder his Commaund and each Factorie to haue 3. or 4. Newe Comers, one to learne the Languadge which in tyme wilbee verie available vnto our affaires, and by degrees in case of mortallitie, or otherwise may rise in succession according as they may seeme to deserve. And for further Light vnto the Trade of all those partes wee haue thought fitt to annex herevnto such discriptions and intelligences as wee haue receaued and gathered out of such advises as wee haue had from our ffactors whereof you may make such vse, as you find most convenient.

The Discription of Zeilan. Zeilan in it self is a rich Iland and hath the best Cinamon of all the Indies, it hath also some Rubies, Spinels, Cattes eyes the best and finest of all the worlde, onlie they are not found in any quantitie, and such as are found come for the most parte into the handes of the

Portingalles. Here also by the Iland of Manar hath been the famous fishing of Pearles which within theise 8 or 9 years is whollie decayed, so that for this presente there is nothing to bee done. The Dutch haue their men lying att Candie but do nothing, neither doth this Iland vent any forraine commodities, saue onlie some Course Lawnes, which in great abundance are brought to them from Negapatam by the Calenders and Chulias whoe for their returne bring from thence fine Matts and Cinamon Arecas, ffor the *Cinamon* cometh most parte.................................................

## The Discription of.............................

## of Coromandell

This Coast of Coromandell according to the Common Computation of the Chulias and Portingalles beginneth at Negapatam and stretcheth to Casincotta in Ozira ; In this Coast of Coromandell or Chulia mandell bee two principall Kinges, the one of Narzinga or att this presente of Velour, which beginneth at Negapatam and endeth at Cariek, or Montepoli: The King of this Countrie is called Wencapeti Raija, the other kingdome beginneth from Montepoli vnto Cassimcotta and is called teligana or Badaga whose King is called Cotobaxa, the one beeing a Gentile the other a Moore each of them haueing their sundrie Lawes, manners and goverment which breiflie to recite, wee will first begin with ye King of Velour.

## The Discription of the kingdome of Norsinga alongst the Coast of Coromandell.

The King Wencapati Raïa beeing a Gentile deceased in October 1604. aboute the age of 86. yeares, hee was

Cosen to the great King Rama Raia, It is an auncient Custome in this kingdome, that the Kinges devide their Countrie in 3 principall Naicques in manner of a Loane to them and their heires, paying yearlie a certen Rent, and when the King hath any warres, they serve him with a certen Number of Elephantes horses and Souldiers att their owne Costs and Charges, and att this presente tyme this Kingdome is devided into 3 principall Naicques to witt to him of Tanianco; him of Tirepopelir and to the Naicque of Madurie of which country of theise 3 Naicques betweene Negapatam vntill St. Tome and deeper towards the·······································ettle for himself··································and ffortes, and although the King... .. . .........eth the souereigne goverment to himself and···············t without his Confirmation nothing is of any vallliditie but must come yearlie to shewe their obedience, yet notwithstanding they are sufficiently Kinges, ech of them in his gouerment doing what hee will, which happened for the most parte by the Kinges age whoe hath not beene able to settle a good order in all thinges; through which meanes theise Naicques do much pill and poll their subiects, ffarming out their townes to the Bramanes, which whollie do consume the poore Commons, that it is too bee wondred howe they are able to mainteyne their famillies; This is the principall goverment of this country. And touching the trade here, the Portingalles haue had a mightie rich trade which might bee accompted the verie best in the Indies, but in regarde they are put from their Trade in Jaua, Amboine, Banda, Moluccos, Solor, Borneo, Siam and Petania, this also is much decayed, so that at this tyme they are hardlie able to mainteyne their famillies; Negapatam and St. Thome beeing so much decayed as is vnspeakeable. In this kingdome the Dutch haue two ffactories, (to witt) one in Tanagapatam belonging to the Naique of Tirepopelir;

whereas they are at great charges and little profitt, so that they haue been often minded to raise that Factorie; the other is att Paleacattee which belonged to the Queene Obaijanna, here the Dutch haue great privillidges, so that they might here build a howse of brick att their pleasure, and that no Nation in Europe might come to trade there without Commission from Graue Mowrice, so that the Globe coming there and the James after them, were denyed the Trade; The Hollanders haueing built there a strong Castle with 4 Bullworkes and 16 peece of········ ··············they haue··········· ......... ......Solor, Mœccasser, Jaua...... .. ........ and other places for the venting of the···········Cloth, wherein consisteth the proffitt, here are made the best Callicos and best sortes of the whole Coast. In regarde of the long tyme that they haue beene brought vpp in itt by the Portingalles, so that they presentlie knowe what sortes will fitt when a man telleth them for what place hee will goe, ffor that there is no great difference betweene the Clothes fitting Jaua, Mulleij and Siam, as also betweene the sortment for men, women, and Children, which is to bee had at Me-ulpatan ffor although they haue the best musters in the world yet they cannott make them as one would haue them; ffor which Cause this place concerneth the Dutch verie much although they are att great charges. The Commodities that are requested here are Pepper, Nutmegges, Mace, Cloues, but not many, Sandellwoodd, Brimstone, Camphir, all sortes of China Commodities except porcelane, which is worth nothing here because the Gentiles may not eate out of porcelane, but onlie out of Leaues, of trees beeing ioyned together, or out of Copper dishes, whereby purslane is only vented to the Mores, a parcell of lead and quicksiluer, vermillion, redd branched Corall is here vented, but no vent of English=Cloth, and although Ambergreece, Musk Ciuitt and other such like perfumes are much vented here, yet to what profitt I knowe not, the Countrie as before yeildeth the best coloured paynted Clothes or Collicoes but not whites, for therein Bengala passeth all the Indies; Moreouer in this Kingdome is the myne of diamants called roqua noua, which is scituated betweene Uandrigiri and Wisnagara from whence they are carried to Uvsapor in the kingdome of Decan where Dabul lyeth, whereat those of Doa and other places come to buy them, so that for this presente the Staple is there, and for other Commodities itt yeildeth none worth mentioning.

To keepe a.......................................................
......would surpasse the Charges.......................................
......lie might be ymployed 20 V (?) R$^s$ which.....................
.........loyments in regarde they bee of in the best sortes y$^t$can bee sent from any other place, will not onlie yeild good profitt, but also keepe the Trade in reputation and...may come to pass that wee may gett footing in the Moluccos, when as the Maleijes shall see themselues aswell furnished by the English as any other Nation therefore itt were good to settle a ffactorie here in such place as should bee found most fitting, which the deceased King promised Mr. Floris, and for performance gaue an *Old* of Gold sealed with Sandall; which Jaga Raija promised also vppon the Kinges death and seeing the Companie haue their Trade alreadie in Sumatra, Jaua Mæcasser, Borneo, Patanie, Siam and other places, they haue sufficient meanes to vent those Callicoes &c., the rest in encreasing or lessening may be seene vnto by the Generall and Counsell, and if the Companie will medle with the trade of Diamantes, here might a great stock bee ymployed, but what profitt would growe thereby experience must try, yet by supposall the Portingalles bring them att the Second hand and carrying them into Portingall and from thence for England and other places, the Companie

might finde gaines therein by buying them att the first hande, but must haue true servantes and men of good knowledge beeing no doyt better cheape there then att Succadania.

## The Description of Badagatt or Telingana.

This country in tymes past was belonging to y^e great King Rama Raija who gaue it gouerment to a certen Persion as also Cancam and Decam to two other Moores, who murthering the said King made himself King beeing called Cottobaxa, who sithence hath enlarged his dominions to that of the Grand Mogor, Nisainxa adelxa and the Kinges of Velur and Orixa and along the Sea Coast from Montepeli to Cassincotta.................................. ..

..........................league with him..............................
might be made in the same mann...................................
Condytions which the Dutch haue, wh...........................
coming at Mesulpatam is easily learned, and to see howe they would accomplish the said Contract and in this manner those difficulties might bee prevented and a quiet and sure Trade established, and although such an Ambassadge would not cost lesse then 3000. Rs· yet such a somme must not bee regarded, ffor in fewe years itt will come in three fould againe, And if this freindlie Course should take no effect att all, but that the Governours violence contynue and the King not looke into itt, then to breake vpp and saue the Factory and make sharpe warr vppon his Coast in such sort as itt might coome to the Kinges eares, and that they should bee afraid to put their heades out of the dores, which may bee done with small force and little charge, sending to the King and shewing him the reason of those proceedinges, and no doubt but the King and Moores wilbee glad to giue such priveledges as in reason can desire, This course the Portingalls att first tooke and thereby not only obteyned large previllidges but had a

Captaine of theires reached to Mesulptan, Petapoli and other places with great sommes for his maintnance from the King, but nowe that the Mores see that the power of the Portugalls declyne, they haue thrust away their Captaine, and surelie the houlding vpp the Shippes in the Red Sea wrought the Trade of Surratt and theise prowde Mores according to their owne Proverb must bee kept vnder, otherwise they will too much Insult and Dominere.

## The Description of Bengala.

Bengale is devided into two principall partes vizt Portogrand and Porto piqueno beeing both att the head of the great Riuer Ganges about 30 leagues one from annother, whereof Porto piqueno is belonging to the Grand Mogor, farr surpassing them of Porto-grand in all manner of Riches, Manufactures and Trade, and in the Riuer lyeth the famous Cittie for Marchandizing called Satigam; In this Porte or Haven..........................................................
........................galles..... ........................................ .....
so···dos; Here are made the be············periens (?) of all the the Indies (to witt) be···············pari, Santars Sahangs, taffesiles Megas (?) gingams and other sortes of Cloth, ffaire stitched couerletts pavillians vnmade vpp, Cushions, shopclothes fir Barbers and other Curiosities, abounding with sugers, Comfetts, wax, honye, and such like, This Countrie venteth all manner of Commodities as att Zurat and Mesulpatan, not that Bengala it self doth consume them, but they transport them vpp the Riuer in greate boates whereto they are commodiouslie fitted. Of this place there is cause to haue a better opinion then of any other in the Indies, the gouerment wherof cannott much differ from that of Zurratt and Mesulpatan, and by the meanes of the Ambassador

at Agra may bee purchased such privelledges and liberties as might bee expedient; Likewise the Ambassador will thereby bee more respected in the Court and beare his state with less charges. So that by anie meanes, it were to bee wished that a ffactorie were there settled, and if there bee anyhope in all the Indies for the venting of English Cloth, this place may be thought to bee the cheifest, because the Province lyeth so much Northerly haueing so good Convenience for their transporting not only to Indestan, but also into Tartary and Cattaya, whereby there is reason to thinck this place like to bee as proffittable as which they might Inhabit without feare of Enemies, Porto grande or the greate hauen of Bengala is so named not because there is greater Trade there then att Pequeno, ffor it can no way bee compared therewith, but because greater shippes can come thether then in the little hauen which is full of sholes. In this hauen lieth Sindine where they make great store of salt, which furnisheth all Bengala. In the tyme of Manuell de Malta and Domingo Carriallo weare in Portogrande and the fforte of Diange were vnder their power and all Bengala vnder Contribution then the Portugalls flourished........................ .........Arra.. ...................... ... ....poore kingdome yeilding nothing of it...... ..........................but (?) Rice, but since the King was assist.......................................the Portugalles hee tooke and distroied Pegu and from thence brought greate Treasure greate quantitie of Jewells, brasse ordnance, ffaire women, the white Elephant and the Kinges daughter of Pegu, together with a greate number of Pegu slaues, whereby Arracan is much encreased, and Pegu beeing destroyed, all that Trade is come to Arracan from whence they traded both by Sea and land for Arba, where much gould is and the myne of Rubies and Saphires, but now within theise fyve yeares the King of Arba hath taken

Drough zangu and lately Siriangh whereat Phillippo de Bretto had a fforte and falling at enmitie with him of Arracan aboute the white Elephant and hath stopped all Trade; so likewise the Grand Mogor hath sent an Ambassador to this King desireing the white Elephant, which Ambassador was euil entreated by the King of Arracan, which the great Mogore taketh in ill parte and warring vppon him taketh diuers places in Bengala, haueing sworne not to giue over vntill hee haue the white Elephant, and although the Castle of Arracan seeme Impregnable, yet it is to bee feared that hee will not bee able to keepe it against the Mogore, and hereby the Trade is whollie decayed and att this tyme nothing to bee done, The Dutch haue a ffactorie here, which they wish they were with Credit quite of.

## The Description of Pegu with the following Coastes vntill Pera and Malacca.

Pegu hath beene a mightie Cittie and an Empire haueing vnder it 14 Kinges amongst whome are comprehended, Camboija, Siam, Laniugh auja and others, but as all Monarchies haue their riseing and falling, so also this mightie Cittie of Pegu by Tyranie . ................ ..............
..............................................................taken
was spitted vppon a sp ..................................Ugalles
slayne, This King of Awa.................................... ven
Charge to build Pegu vpp againe haueing promised Liberties and Privillidges to such as shall come thither with their Shippes or will dwell there, If the trade amend and come againe and come to anie ymportance, the Companie may haue a trade there both in Pegu and Awa whereas is a myne of Rubies, Saphires and Spinels, The Emerales are much

requested here, Moreouer here lye the Townes of Pre, Martaban, but here is nothing to bee had. Then followeth Tanesseei, which by the distruction of Pegu is become the Sea-towne of Siam, but in regarde this trade is here att ende, then followeth the Townes of Junckealam, Laniaugh, Keda, Pera, and Malacca, At all theise places nothing is to bee had, howbtt in Iunckalan and Pera is great store of Tinn held as good as English Tinne, but it is so bought vpp, that it will require great tyme and trouble to gett it, and to adventer in Moores shippes would not bee safe, and their owne Pinnasses too Chargable, so I leaue it as no way worthy.

## The discription of the Iland of Sumatra.

This Iland of it self is a rich Iland, the riches whereof yt may bee thought the Inhabitants do not knowe, ytt yeildeth great quantitie of Pepper, brymstone, ffine Comphire, Beniamin, gould peter Oyle and as some say Balme and Ambergreece and Bezar stones called Pedra del Porco and other Commodities; Itt hath many fruits but victualsl especiallie rice it hath scarce ynough for their owne maintnance. In this Iland are many pettie Kinges as of Palinbam, Jambi, Andrigiri, lying on the East side and Manancabo lying in the Middest of the Iland att the southside, the North and westside, belongeth altogether to the King of Achin (To witt) Siacca, Ara, Gowri, pacci, Pedir Acchin, til, Ticao and Priaman, so that hee is not...........
..............................................................................
...........both from Zuratt, Dabull (?).......................
Malabar, Negapatan, Commall . .. . ........ .. ......
and other places, so that the Country is filled att all tymes, and besides the Guserats and Calindre are much trayned

in the trade, that they knowe better then wee howe to make proffitt, ffor besides ye sortment they buy them better Cheape, and are at lesse charges, but they make great profitt in that they sell, ffor if they find not their price in Achin they presentlie hire a praye and go alongst the Coast not spareing any Brooke, much less any Riuer or Towne whereby the lesse sales will att first bee found; The King forbiddeth all strange Nations to trade at Priaman and Tecoa except they first come to Achin and gett order from him, for which hee did fforfeyt and Confiscate a Guseratt shippe, but ouer our shippes hee hath no power, yet in Achin little is to bee done, and the Coast of Sumatra a perillous Coast, so that it were expedient to put on this Coast no more with their great shipping, but with a small shipp yearly expresly for trade with them haueing also a Pinnace of 3. or 4. tonnes which may contynuallie goe and come betweene that and the Coast of Bantam, which shipps should bee furnished with such Surat, Coromandell and Bengala sortes of Cloth as are there most requested, the Shippe may fittest ly in Tecoo to buy vpp all the Pepper of the Circumiacent places and the Pinnasse to lye in the Riuer of Cattaganga and deale for the gould of Mununcabo which is brought thither beeing vnder the dominion of the King of Achin, and so might yearlie bee had about 1000. Bahars Pepper and 15. in 20. V (?) Rs. in gould and by this meanes the Guzerats and Calinders would quicklie bee driven from thence and the trade fall to the Companie, ffor they must of Necessitie seeke out places for the venting of the India Clothes or ells the trade of Surat, Coromandell and Bengala is worth nothing, And although at the first they should sell itt good Cheape yett itt would bee a good begining, and with Corespondencie for the sortes of Cloth mainteyned although not with……………………
……………………………………scituated in the…………………

....................................ing in Rice, so that therewith it fa......................................p[ro]videth all the Countries thereaboutes as the...............luccos, Amboine, Banda and other places, so that many (?) Junckes come thether yearlie, which causeth a greate [tr]ade; the King is latelie turned Moore beeing an Heathen before; this Iland hath nothing of it self but Rice, but in regarde of the quantitie of the Juncks that come and goe, there is many tymes to bee gotten a parcell of Spices, Sandall woodde, Tortoyes shelles, Cetie, wax and such like Commodities which may bee bought to good profitt, And although the Dutch forbidd all the Junckes to transport any Cloues from the Moluccos vppon Confiscation thereof, yett they dare not do itt to the Junckes of this kingdome because of the ffactorie which they haue here, and because their fortes must bee provided with Rice from hence, this place venteth yearlie a good parcell of India Cloth of all sorts so that in anywise a ffactorie is here to bee settled.

## Succadania.

This place lying in the Ile of Borneo doth vent some parcell of India Cloth, but wee cannott hould it to bee profittable by reason of the greate Charges which run vpon this ffactorie and the smallnes of the Capitall that can bee bestowed here together with the dearnes of the Diamonds and bezar stones there to bee bought, and if any quantitie should bee gathered, then must wee send gould thether which wee should conceaue might profittablie be sent and ymployed in the Moluccos and Amboyna beeing there worth 50 or 60. per Cent proffitt and in better request there, then Cloth or Rialls ffor when nothing ells will procure Cloaues, gould will do it: It is a question also wheather, this gould might not bee better imployed in Bantam then att Succadania: which your experience can soone resolue: Yet notwithstanding itt will not bee good to breake vpp our ffactorie suddenlie there in

hope of better doinges, booath in the vent of Cloathing, and to keepe the Inlandish trade in action; but to bee in this wee haue more skillful Jewellers and honest ffactors not to bee Cosoned, nor to coson vs, ells our Charges will ouertopp our gaines. The description of..........................................
.......................................................................
...........here falles a.............................................of good store of India Cloth are.......................... ...............
..........................It yeildeth, extraordinarie good Comphire tak......this (?) name in an excellencie: Camphere of Borneo, bezar stones in quantitie aboue all the Easterne Ilands, some Diamondes; Here wee are wished to haue a ffactory planted, which by those of Patania may easilie bee brought to passe, whoe trade much for this place; This Camphere is a verie good Commoditie in Zuratt, Corommandell and Bengalia; Here are also good Tortoyes shelles which are an extraordinarie Commoditie for Zurat; this place may bee mainteyned with a ffactorie with a small charge by reason of our ffactorie att Patania.

## The Discription of Patania.

This is an auncient Kingdome, but alwaies onder tribute of the King of Siam; att this tyme doth an oulv woman rule here, whoe was the Daughter of the last King, whoe did about 30 years since, yet though the woman ruleth, the gouerment is reasonable good, and the strangers haue no great cause to complaine of any great trouble, Yet wee may complaine for the great charges wee pay there, for att every shippes arivall wee must pay 2000 Rs. and 5 per[c]ent (?) for all goodes brought in, and as much for all carried out and waying money according to the quantitie of wares you way, and some other bribes besides; To bridle this people itt were not amiss to build a strong howse in Sangora which lyeth 24 Leagues northwarde of Patania, vnder the gouerment of Datoe Mogoll vassall to the King of Siam: In this place maie well the Rendevouz bee made to bring all thinges together that you shall gather for the provideing of the ffactories of Siam, Cochinchina, Borneo and partlie our ffactorie in Japan, as you shall gather according to the advises thereof, And hither to bring all such wares as wee shall gather from the foresaid places to bee sent to Bantam or Jaccatra: this howse wilbee found to bee verie Necessarie, for the charges wilbee too highe in Patania besides inconveniences there; which charges you shall spare at Sangora: there you pay no Custome, onlie a small guift to Datoe Mogoll cann effect all here; The Dutch haue taken this course nowe for ye……… ……………………………………………take (?) it…………………… ……………………to be diverted from them, they will………… ……………………… lett (?) fall their great charges: So that thoese two places may well bee compared to Bantam and Jaccatra The traffique in Patania is reasonable, it yeildeth no speciall Matters of it selfe, but is all brought in from other places and because of the scituation of the place there is great shipping for diuers places, whereby much marchandize is brought hither, especiallie of China wares, by reason of the Nearnes of the Countries would bee brought if there were buyers. This place venteth good store of India Cloth, but must bee of the finest of Pellicatt both painted and woven: The fine Cloth of Bengalia is here likewise sould to profitt but coarse cloth is in no request att all.

## The discription of Siam.

Siam many yeares agone itt seemeth hath been a famous Kingdome bearing rule ouer others, euer beeing in good creditt with the King of China which kingdome receaued their Lawes and religion from Siam; so confessed by their mutuall sending of presents euery 3 yeares each to other. The King of Siam, Raja Api (or the faire King) died 1605 whome his brother called the White King did succeed, hee dyed also 1620 and his second sonne inheritts who nowe liveth and vppon whome many Kinges do make warres and do hope to put him out of his Throane. Hereby wee may see the dangerous estate wherevnto Siam is nowe brought, and the hazard which wee doe beare in those places, concerning trade there nowe, it is not great, but quietnes beeing obteyned through the victorie of the one side or other, there will doubtles bee good trade againe, and bee a good place for our Companie; ffor this Countrey venteth a good parcell of Cloth both of Bengalie and Coromandell, but of Cambaia cloth fat and faire the people nowe beeing vsed to weare itt. This place venteth other kinde of Cloth that Jaua or Malleya do and the people are verie Curious of their Cloth especiallie painted, whereof those of Sct. Thome and Palliacatt haue the best trade, which sortes are not only vsed in......................................... ................................garne.......................................... vallue Diamantes it hath non........................[c]onclude the revenues of this King is grea...............he liueth after the manner of the Persean Pomp.........and the Perseans do here dominere ouer the Gentile... . ...that it is pittie to see and do eate and Consume the poore peoples with taxes and violences, and if peradventure there ariveth a strange Shippe here especiallie att Musilpatam, It is in the Governers power to giue such safeconduct as it pleaseth him for forming the gouerment, Hee is to pay great Summe of money, hee bearing the gaine and losse, wherefore rather lett a shippe goe away againe, hee will abate as much as is possible, and giue you the fairest wordes hee can vntill hee haue you and all your goodes on shoare, then hee will begin to sing annother song, and will Invent a thowsand knaveries vntill you are wearied, and glad to content him, which Contentment doth not consist in giveing one or 200 pagados, but in dealing and contracting for many Thowsandes according as they shall perceaue it Cargason to bee, and if in the meane tyme it chance in the meane tyme, that they bee put from their gouerment, the debte is absolutely lost, and if you bee so fortunate that they contynue in their gouerment, yett they will hould you vppon delaies vntill the Monson bee almost expired, so that you must bee glad to escape of any thing they shall offer you, which is not worth half the money, yea such as serveth not your turne. Here the Dutch haue two Factories one in Petapoli which is of small ymportance and if the Companie haue a Factorie in Paleacatte, then is Petapoli needles beeing but a daies Journey from Mesulpatan where they do vent great store of Marchandize of all sortes of China wares purselane, pepper, Nutmegges, Mace, Cloves, Sandall, Cigim, Aloes, Musk, Ambergreece and Ciuitt..............little, except for the Kinges... ........................yeare sufficeth and those verie rich and... ........................well sett forth; ffor other Colours they will not yield the price in England; The Dutch notwithstanding all their greate Trade haue beene forced to suffer all those knaveries and vexations, and the Governers owe them 8000. Pagados so that thep could beare it no longer, so that they went to the King whoe gaue them faire wordes for couering their debtes, but little was performed, yet they obteyned that hence forwarde they should not haue to do with the Governers but pay to the King yearlie 3000 Pagodes and so to bee free from all other charges as Custome for all goodes out and in, ffor that as farr as the gouerment of Mesilpatan stretcheth as well for that they shall bring or Carrie away in their owne shippes, as other shipps of the Moores, and are lycenced to unlade and lade their goodes without opening their packes by the Governers or keeping them all night in the Custom house, which is the greatest bridle that can bee put in theise Knaues mouthes ffor now seeing with violence they cannott prevaile they come with flattering wordes and a great showe of service to haue their good willes, and this was a great vexation done to Flores in keeping his goodes vntill they had wearied him, and although hee had sufficient meanes to prevent the same att ye Court, yet hee did it not in regarde the charges would haue lyen wholie on the Seaventh voyage, Neither as hee with had hee any whome hee could send, himself not beeing to be spared, which forced him to giue them Content and gett from them as the first tyme in takeing a parcell of Cloth which were not worth halfe the money. And the second tyme hee tooke the Governers sonne from out of the Customehouse prisoner aboard not without danger. And so ye James also had beene served, If the Globe had not come to succour. Yett this place much continueth (?)..................... ............ ....................................................................but yet it yeildeth,................................as at Mocha from whence it is transpo..................Egipt, Beniamin cometh by land, Lau throug[h]..................augh, which passage by the presente warrs is stopt, the gould for the most parte cometh from Xamaj, but all here beeing in vproare, little is brought, here falleth good store of hearts and Buff skynnes, which are currant Commodities for Japan, so that it may well bee concluded that if peace might come here would bee good profitt gotten for our Companie: Secondlie there might bee hope to gett footing in China, because of the amitie, it is betweene China and Siam, and an Ambassador might bee sent with the Ambassadors of Siam with letters of Commendations from his Maty. to the King of China or at least to the Mandorin of Canton; whereby at the least they might be spoken with all and here and giue answere to our reasons, but as long as the Warrs do contynue at Siam, there is but little hope of either.

## The discription of Camboja.

This Cittie lyeth vppon a great riuer, which is said to take his begining where Siames riuer taketh his beginning. It hath thre yssues and falleth into this Kingdome; itt hath alwaies for the most parte beene vnder the subiection of Siam or Pegu, but nowe it seemes to cast that yoak of; Here those of Mallacca haue had a greate trade but nowe it is decayed, This Country venteth the most part India Cloth as Siam doth, and beeing nowe in League with Laniaugh, the trade is nowe att Camboja, for this furnisheth the whole Country, with Cloth, And here is also nowe the Staple of Beniamjni, And here is also Gome=lack: gottamandu or Comboja gum, Sapom: Cassamba great quantity of deere skinnes, so that there might be sent a great Junck for Japan Laden with Marchandize, and to haue good returnes for Coromandell, Zurratt and England, So that wee must haue factory herein so.

## Finis for this discription.

Vntill I hope to haue the rest &c.

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## INDEX.

*Note.*—In this Index the following abbrevations are used; "Anderson" for Anderson's "English Intercourse with Siam" (Trubner's Oriental Series).

"Calendar of State Papers" for "Calendar of State Papers, Colonial Series, East Indies China and Japan." (The first two volumes are edited by W. Noel Sainsbury, the third by Miss Sainsbury).

"Crawfurd" for Crawfurd's Descriptive Dictionary of the Indian Islands and Adjacent Countries, 1856.

"Yule and Burnell" for Yule and Burnell's Hobson-Jobson. A glossary of Anglo-Indian Colloquial Words and Phrases and kindred Terms.

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*Amadauar*—Amadavar. Ahmadabad. Founded by Ahmad Shah, Sultan of Gujerat (A.D. 1411-1423). It is the finest city in Gujerat, and is situated about fifty miles North of the head of the Gulf of Cambay (See Cambaia).

*Amboine*—Amboyna. (The native name is Ambun). It was first a Portuguese possession: the Dutch took it from the Portuguese in 1605. The British founded a trading station there soon afterwards, and thenceforward there arose, between the British and the Dutch, continuous disputes, bickerings, quarrels and fights, which culminated in the "massacre" of 1623, in which the British Settlement was killed by the Dutch.

For this massacre, which is celebrated in Dryden's Tragedy of Amboyna, Cromwell obtained compensation from the Dutch in 1854. The British held the island from 1796 to 1802. It became Dutch again in 1814.

*Andragiri*—Indragiri. (Sanscrit, "the Hill of Indra"). A Malay State of the East Coast of Sumatra, North of Jambi and South of Kampar. The Indragiri River, which is one of the largest in Sumatra enters the Straits of Malacca opposite the islands of Linga and Sinkep.

*Ara*—Perhaps Aru Bay between Diamond Point, on the North East of Sumatra and Deli.

*Arba*--Ava: the ancient capital of Burmah.

*Arracan*—Arakan. The Arakan Division of Lower Burmah extending from the Bengal boundary, along the coast, to the mouths of the Irawaddy.

*Auja*—I cannot identify this place.

*Badaga: Badagatt.*—A corruption of Balaghat (bala, above; ghat a mountain pass); the country above the passes; a term applied to an area which is now covered by the

Bellary, Anantapur, Kurnool and Cuddapah Districts of Madras.

*Bantam*—A glance at a map of the world shows that all the traffic of the Far East has either to pass the northern or the southern extremity of Sumatra, either round Acheen Head, that is to say, or through the Sunda Straits. The latter route is the nearer: the former is the safer, and is the only one followed by all steamships of the present day.

Bantam at the western end of Java, not far from the present city of Batavia, was therefore a central place for the principal factor of the East India Company. The China trade came down to him on the one monsoon, and the Indian trade on the other: each was handed transhipped and despatched, westward and eastward, on the succeeding monsoon.

*Barocha*—Broach—A port in the Gulf of Cambay between Cambay Town and Surat. *See Cambay.*

*Bernee*—Brunei, which has given its name to the whole island of Borneo. Borneo, itself, is mentioned by that name later in this account.

*Bezar stones*—Bezoar stones. See the articles in Crawfurd, and Yule and Burnell.

*Breto de.*—See Siriangh.

*Calindre : Calendar.*—I cannot discover the meaning of this word. Karinda (Hindistani Karandah) is a word meaning a clerk, agent or manager. But in this manuscript the word is used as if it were the name of a nationality or race.

*Cambaia*—Cambay (Khambhayat). The Gulf of Cambay is an inlet of sea lying between the peninsula of Kathiawar and the Indian Coast line. The Portuguese Settlement of Diu lies at its mouth in the Kathiwar Peninsula, and Surat is at its mouth of the Bombay side. The town of Cambay is at the head of the Gulf. It is mentioned by Marco Polo, under the name of Cambaet, as a place of great trade. A tidal bore is causing the gulf to silt up, and trade has now left the place.

The Kings of Guzerat formerly had their residence at Cambay. The most famous of these Kings undoubtedly was Sultan Mahmud Bizarha, of whom there are lurid accounts in Purchas and Ludovic's de Varthema. He is thus immortalized by Butler :—

The Prince of Cambay's daily food
Is asp, and basilisk and toad,
Which makes him have so strong a breath
Each night he stinks a queen to death.

*Hudibras* Part II. Canto I.

*Cancam*—Konkan (The Konkan). See Deccan.

*Carica*—I cannot locate this place.

*Cassamba*— Kusumbha (Sanskrit). Both saffron (*crocus sativus*) The bastard saffron, or safflower (*Carthamus tinctorius*) is known by this name. From its flowers a red dye is made.

*Casincotta :—Cassimcotta.* I cannot find this name in any Gazetteer. Apparently some compound of the name Kassim.

*Cattaganga*—I cannot locate this river.

*Cattaya*—Cathay, China. See the article "Cathay" in Yule and Burnell.

*Chulia.*—A name applied to Muhammadans from the Madras Presidency. The origin of the word is obscure, and its application vague. It is not certain whether it is applied to all Muhammadans of Madras, or whether it applied to the Malabaris, or whether it applied to any particular class of Muhammadans. In old accounts of the Colony the name was frequently used, generally in connection with the word "Kling." The term is no longer used, but a Chulia Street still exists in Penang.

*Comboja Gum*—Gamboge. See the article in Crawfurd.

*Corromandell*—The Coromandel coast was a term applied in old histories and official correspondence to the east coast of the Madras Presidency. It was applied in no very definite sense, and now has fallen into disuse. In this account it extends from Negapatam to Orissa and includes the Kingdom of Narsinga, which extends from Negapatam to Montepoli, and the Kingdom of Taligana, which extends thence to Orissa. It will be noticed that the writer of this account gives an etymology of the name, deriving it from Chulia mandel. The true derivation is from Chora, the Tamil form of the ancient title of the Tamil Kings who reigned in Tanjore. There is a very interesting account of Coromandel, with a list of the various fanciful etymologies that have been attempted by different writers, in Yule and Burnell.

The Coromandel Coast corresponds in extent (more or less) with the Maabar of Marco Polo.

*Cotobaxa: Cottobaxa.*—Kutab Shah. Kutab Shahi was the name of a branch of the Bahmani dynasty, which established itself at Golconda. Kutab-al-Mulk, tarefdar of Telingana, founded the dynasty and assumed royal title in 1512. The dynasty lasted until 1687 when Golconda was taken by Aurangzib.

*Dabul* (*Dabhol*)—A famous port of the South Konkan between the fourteenth and seventeenth centuries. It lies in the modern district of Ratnagiri about two degrees north of Goa.

Barbosa (A.D.1516) writes of it:—

The Dabul has a very good harbour, where always congregate many Moorish ships from various parts and especially from Mekkah, Aden and Ormuz with horses and from Cambay, Diu and the Malabar country.

*Decan*—Deccan (or Dakhin) (The Deccan). The name is a corruption of the Sanskrit word *dakshina*, southern. It is a term generally applied to the high lands of India bounded on the North by the Narbada, on the East by the Eastern Ghats, on the South by the Kistna and on the West by the Western Ghats. The name Maharashtra, or the country where the Marathi language is spoken, is applied to the same area. The term Konkan (of which the origin has not been satisfactorily explained) is applied to the narrow tract of land on the West Coast between the Deccan and the Sea. It includes Bombay, Ratnagiri and Goa.

*Doa*—perhaps a mistake for Goa or Diu.

*Droughzangu*—I cannot identify the place.

*Gingam*—See the article "Gingham" in Yule and Burnell. See also Taffesiles, infra.

*Globe*—The Ship "Globe" was fitted out by the East India Company in A.D. 1610 to take part in the Company's seventh voyage to the East Indies. She sailed from "the Downs" on the 5th February 1611, and after a prosperous voyage arrived at Ceylon in August of the same year. Thence she sailed to Pulikat, Pettipoli, Bantam, Patani (which she reached in June 1612) and Siam—For full details of the voyage of the Globe see the calendar of State Papers and Anderson *passim.*

*Gouri*—I cannot locate this place.

*Grand Mogor*—See Mogor.

*Jacatra*—The name by which the town of Jayakarta was known to Europeans. Jayakarta is Sanskrit and means "work of victory." The city of Batavia, founded by the Dutch in 1619, now stands upon its site.

*Jambi*—A Malay State on the East Coast of Sumatra between Indragiri and Palembang.

*James*—The Ship "James" was fitted out in December 1611 for a voyage to the East Indies. A full account of her is given in the Calendar of State Papers and in Anderson.

*Junckealam: Junckalan*—Junk-Ceylon (Ujong Salang) now better known as Tongka.

*King of Siam*—See Raja Api.

*Laniugh*: *Laniaugh*—The Kingdom of Laniaugh is mentioned by the Peter Floris (Thevenot Vol. I) several times. A place named hang-siangh is mentioned by Mandelses, and is identified by Anderson with huang-praban.

*Madurie*—The Madura District lying the east Coast of Madras south of the Native State of Pudukottai, and east of the Western Ghauts.

*Manancabo*—Menangkabau, an inland district of the southern part of Sumatra.

*Manar*—On the North West Coast of Ceylon. The island of Manar is the beginning of Adam's Bridge, which runs hence to the Indian Coast.

*Martaban.*—On the right bank of the Salween almost immediately opposite Moulmein. The capital of the Peguan Kingdom was at one time here. In the many wars between the Peguans, Burmese and Siamese, it was several times besieged and taken. Towards the end of the 16th century it was taken by Siam. Later it became independent again for a time, but afterwards was the seat of a governor appointed by the King, Burmese or Peguan, who happened to be in power at the time.

*Mesulpatam : Mesulptam : Musilpatam.*—Masulipatam. Now headquarters of the Kistna District, Madras. A port which developed a great trade, principally with the ports on the opposite side of the Indian Ocean, in the seventeenth century. The East India Company first traded there, in the "Globe" in A D. 1611. In 1628 the English were driven out by the Dutch. They returned in 1632 having obtained a farman from the Sultan of Golconda. The town is described in 1670 as being "famous along the coast of Corromandel" and as "resembling Babel in the variety of tongues and the "differences of garbs and costumes." Its manufactures of carpets, chintzes and coloured cloths have been crushed out of the market by European piece goods and its trade has been diverted elsewhere by railways.

*Mogor*—The Grand Mogor is the Portuguese form of the title of the Kings of Delhi of the house of Timur (*o grao Mogor*). The common English form is the "great Mogul." See articles "Mogul" and "Mogul, the Great" in Yule and Burnell.

*Montepoli*—I cannot locate this place.

*Mulley*—A variation of "Malay." It is not unlike Marco Polo's "Maliurh," and is interesting because of its resemblance to the word "moly" (sometimes "moley" or "meley") which survives in luncheon menus, and which simply means a kind of watery curry prepared by an Indian cook in what he considers to be the Malay fashion.

*Naicque* (*Naik*)—This word (which is derived from the Sanscrit *nayaka*, a leader,) is used in several ways in India, its most common application being in the Indian Army to a rank corresponding to that of Corporal.

Among the Telugus, it is the name of a caste, and the general name of the Kings of Vijayanagara A.D. 1325-1674 and of the Lors of Madura (A.D. 1559-1741). See the article "Naik" in Yule and Burnell.

*Narzinga*—This is the name applied by the Portuguese, and later by the Dutch and British, to the Great Southern Indian Kingdom of Vijayanagara, or Bisnagar. The name is not really that of the country (and for this reason it will not be found in any Gazetteer), but is that of Nara Sinha, a prince of Telugu origin (circa 1400-1508) who was reigning when the Portuguese first visited the place. The country bore this name among the Europeans for nearly two centuries after his death. Vijayanagara was the name of the capital that gave its name to the kingdom. It either means the City of Victory, or is a corruption of Vidya Nagara (the City of Learning). "The Pagan King of Narsinga, who has "1,500 elephants of war, 49,000 horse, as much foot as "he wishes and so much territory as can scarce be "traversed in six months" is mentioned in the famous letter written on the 6th June 1513 to the Pope, as the head of Christendom, by the King Emmanuel of Portugal to inform him of all the Portuguese successes under Albuquerque. (*Letters and papers of Henry VIII, edited by J. S. Brewer. No. 4173 Calendar of State Papers Vol. I. No. 1.*

Narsinga, Orixen, (Orissa) and Bengalen (Bengal) are mentioned in the report (written in 1660 by Foulke Grevil, Treasurer of the Navy, to Secretary Sir Robert Cecil) which led immediately to the establishment of the East India Company. (*Calendar of State papers Vol. I No. 266*).

Vijayanagara was overwhelmed in 1565 by a combination of Muhammadan Sultans of the Deccan in the battle of Talikota, in which the King, Rama Raja, himself was killed. The place is situated in the Bellary Distict and is entirely in ruins which extend over many square miles. The only part of it now occupied is a little village which bears the undistinguished name of Humpy.

*Nisainxa Adelxa.*—Nizam Shah Adil Shah. The Nizam is the hereditary style of the reigning prince of the Hyderabad Territories. The early Portuguese writers generally used the form Nizamulco, which represents Nixam-ul-mulk, or Nizamoxa, which represents Nizam Shah.

Adil Shahi was the name of a Muhammadan dyna sty which ruled at Bijapur from 1489 till 1672 or later. The Adil Shahis were almost continuously at war with Vijayanagar (Vide Narzinga), and they took part in the battle of Talikota in which Rama Raja, the King of Vijayanagara, was killed and his forces defeated.

The following extract from Garcia de *Orta's Colloquies* (printed in Goa in 1563) is worth quoting in this connection as it contains the variations Nizamulco and Idalcam (Adil Khan).

"This King of Dely conquered the Decam and the Cuncam; and retained the dominion a while; but he could not rule territory at so great a distance, and so placed in it a nephew crowned as King. This King was a great favourer of foreign people such as Turks, Rumis, Coraconis, and Arabs, and he divided his kingdom into captaincies, bestowing upon *Adelham* (whom we call *Idalcam*) the coast from Anzediva to Cifardam ............and to *Nizamulco* the coast from Cifardam to Hegstana."

*Ozira*—Orissa. The ancient kingdom and modern district which lies between the Coromandel Coast and Bengal.

*Pacci* —Often written Pacem. A Malay State near the North East point of Sumatra.

Valentijn gives this account of it:—

" Close to the East point of Sumatra is the once especially famous city Pasi (or Paem) which in old times, next to Magapahit (sic) and Malakka was one of the three greatest cities of the East...............but now is only a poor open village with not more than 4 or 500 families, dwelling in poor bamboo cottages."

See also the article Pasei in Yule and Burnell.

*Pagado* —(Pagoda). A coin (both gold and silver) which was long current in South India. Accounts were kept in Madras in *pagodas, fanams* and *kas* down to A.D. 1818 in which year the rupee was made the standard coin.

8 *kas* (*cash*) = one fanam.

42 fanams = one pagoda.

A pagoda worth 3½ rupees. For an interesting account of the derivation of this word see Yule and Burnell.

*Paleacatta* —Pulicat. A town 25 miles North of Madras City. It is the site of the earliest Settlement of the Dutch in India. They built a fort here in 1609, and the place was later the chief Dutch Settlement on the Coromandel Coast. It was at one time a centre of trade with Penang. It has given its name to the cloth known by the Malays as *plêkat.*

*Palimbam* —Palembang. A district on the South East Coast of Sumatra. The Palembang river enters the sea in the Banka Straits.

*Patania*—Patani. On the East Coast of the Malay peninsula between Kelantan and Singora. The position of Patani on the map explains its selection, in conjunction with Surat (east coast of India) Coromandel (west coast of

India), and Bantam (in Java) as one of the four principal places where the chief agents of the East India Company should be resident. It has a good harbour, sheltered from the North East monsoon, which makes the East Coast of the Malay peninsula dangerous in the North East monsoon, and it was hoped that it would be a centre for trade with Siam, with China and Japan, and with Borneo.

These hopes came to little however, and various exactions imposed by the Queen of Patani and the Orang Kayas soon drove trade away.

For a most interesting account of Patani see the Calendar of the State Papers and Anderson *passim.*

*Pedir*—On the East Coast of Acheen between Acheen Head and Diamond Point.

*Persian*—Parsee. For an interesting account of this word see the article Parsee in Yule and Burnell.

*Petapoli*—Pettapoli, or Pettipoli, was a place on the Coromandel coast at which there was considerable trade in the seventeenth century. It is frequently referred to both in the Calendar of State Papers and in Anderson. I cannot locate it exactly.

*Philippo de Breto*—See Siriangh.

*Praye*—Prahu (Malay).

*Pre*—I cannot identify this place.

*Priaman*—On the West coast of Sumatra a few miles North of Padang.

*Raja Api*—This account would appear to be taken from the account given by Péter Williamson Floris, which runs as follows:—

"The King of Siam fortified himself by the destruction "of the Kingdom of Pegu, and has since conquered the "Kingdom of Cambaya, Laniaugh, Zayomay, Leegor, "Parava, Thenasarim and several others. This con"queror, called by the Portuguese the Black King of Siam, "died in 1605, and left his kingdom to his brother, "whom they designated as the white King. He was a "prince who only desired to reign in peace. He died "in 1610 leaving several children. Thence arose "great troubles for the state for the king, on his death "bed, caused his eldest son, a youth a great promise, "to be put to death, the murder being committed at "the suggestion of one of the nobles, who, being very "rich and powerful, aspired to the throne. The present king is the second son of the White King, and "soon caused the traitorous noble to be put to death."

Thevenot Vol. I. P. 21.

*Sahang*—Perhaps a mistake for *sarong.*

*Sapom*—Sapan wood. See the articles Sappan and Brazil-wood in Yule and Burnell.

*Satigam*—I cannot locate this place.

*Siacca*—Siak. A Malay state on the North East Coast of Sumatra. The Siak river is the finest in the island and flows into the Straits of Malacca nearly opposite the island of Bengkalis.

*Sindine*—I cannot locate this place.

*Siriangh*—Syriam. A town on the left bank of the Pegu river about three miles from its mouth. Towards the end of the sixteenth century the King of Arakan took advantage of the quarrels between the Kings of Toung-Ngoo, Ava and Pegu and, with the assistance of Philippo de Brito y Nicote (to whom a reference is made in this manuscript) conquered Pegu. As a reward for their services he gave the Portuguese the town of Syriam which they fortified. He soon had reason to regret his liberality for the Portuguese were mere pirates and committed the most appalling cruelties upon the wretched natives. A few years later the King of Arrakan formed an alliance with the King of Toung-Ngoo, and tried to drive out the Portuguese: they attacked the town, but were repulsed. In 1613 (the year before the probable date of this manuscript) the King of Ava besieged and took Syriam, impaled de Brito alive and sent all the surviving Portuguese to Ava as slaves.

The Dutch established a factory at Syriam in 1631; The English were some years later. Both were expelled about the year 1670. The English factory was re-established in 1698 by the Government of Madras. In 1740 the Peguans drove out the Burmese, but left the British alone. In 1743 the Burmese retook the town. They held it only three days, when the Peguans recaptured it, and, suspecting the British Agent of duplicity, burnt his factory and expelled him. The town went through many vicissitudes in the wars between the Peguans and the Burmese in the eighteenth centuries. See article Syriam in Yule and Burnell.

*Solor*—Sulu. The Sulu islands or archipelago, for there are 150 islands, extend between Borneo and the Mindano Islands, the Southern group of the Philippines.

*St. Thomé*—Now a southern suburb of Madras city.

*Succadana*—A place on the western Coast of Borneo. In the early part of the seventeenth century, the East India Company had great hopes of it. Its principal reports were wax and diamonds. One account indeed (Calendar of State Papers, Vol. I. No. 522) says that "the best diamonds in the world" were to be procured there. It was once the seat of a Javanese Settlement, and the name, given probably by the Javanese, means, in Sanskrit, "the parrot's gift."

*Surat*—This was a great port at the mouth of the Gulf of Cambay (See Cambaia). When the merchandise of the East was carried to Europe through the Red Sea and thence overland, it was one of the most important trading places in India. With the discovery of the passage round the Cape of Good Hope, its importance diminished: and now, with silting-up of the gulf, trade has deserted it.

The following account of it in the Storia do Mogor (Vol. I p. 61) is interesting from its mention of the trade of this part of our part of the world.

"It is the largest port in India and the best river. Thus, it is resorted to by a great number of ships from different parts of Europe, Persia, Arabia, Mecca, Bassora, the coasts of Malabar and Coromandal, Massulapatas (Masulapatam), Bengal, Siam, Acheen, Queddah, the Maldiver, Malacca, Batavia, Manilla, China and many other parts of the world."

*Taffesiles*—Tafsila—a stuff from Mecca. It is spelt in various ways. Van Twist in his account of India (A.D. 1648) gives a list of stuffs which includes gamiguins and toffochillen. Valentijn (A.D. 1624-1626, in a similar list in Oud en Niew Oost-Indien, includes taffatshelas and ginggangs.

*Tanagapatam*—I cannot identify this place.

*Tanesseei*—Tenasserim, a town on a river of the same name in the Mergui District. Founded by the Siamese in A.D. 1373, it suffered much in the struggles between the Burmese and the Siamese. It was an important city in the seventeenth city, when there was an overland route to Siam, and much of the trade between India and Siam was carried between Masulipatam and Tenasserim. It is now an insignificant town.

*Tanianco*—I cannot locate this place.

*Telingana*—A term vaguely applied by the Muhammadans to the country of the Telugus in the North East portion of the Madras Presidency. See the articles Teliga and Teloogoo in Yule and Burnell.

*Ticao: Tecoa: Tecoo.*—Tiku. On the West Coast of Sumatra, above 18 miles North of Priaman.

*Tirepopelir*—Tirupapeliur or Cuddalore New Town. In the Cuddalore District of Madras near Vellore.

*Velur: Velour*—Vellore: in the North Arcot District of Madras.

*Wisnagara*—Vijayanagara. See Narzinga.

*Xama:*—The great, but imaginary, lake of Chiamay. See the article Chiamay in Yule and Burnell.

# Notes on the Fertilisation of a Few Orchids in Sarawak.

By C. J. Brooks and John Hewitt.

In the tropical forests of Sarawak, orchids are relatively very abundant and a great number of species are there found. A fair proportion have large showy flowers or a conspicuous inflorescence but the majority are small flowered and are not conspicuous. As is well known the peculiar structure of the typical orchid flower is a special adaptation to effect cross fertilisation through the agency of insects but in reality many orchid flowers are rarely visited by insects. The well known orchid Phalaenopis grandiflora produces a spike of large and conspicuous white flowers but though Sarawak is so rich in insect life an insect visitor is never seen on the flowers: and the spike remains in bloom for months until eventually the flowers die without producing a single seed pod. If a single flower be self-fertilised by human agency the whole spike fades in a few days and a seed pod is formed.

In the swampy parts of Sarawak Bromheadia palustris is very common: it produces conspicuous white flowers at fairly regular intervals of three or four weeks but though these have been under continuous observation for a long time we have never seen a large insect on the flower. Still it may perhaps be visited occasionally as sometimes a seed pod is formed, Vanda hookeriana has fine large flowers, the petals spotted with a rich velvet lake and it is always to be found in flower. These flowers if they are not fertilised may remain in good condition for a week: at the end of that time, or in case they lose their pollinia or are fertilised on the day after the visit of the insect, the petals become much bleached the colour disappearing almost entirely. This orchid not infrequently bears seed pods and I am told by the Malay gardeners that

Jour. Sraits Branch R. A. Soc., No. 54, 1909.

the large carpenter bees (Xylocopa latipes) sometimes visit the flowers: this is very probably correct for something certainly removes the pollinia occasionally, but nevertheless it cannot be a very common occurrence as I have watched a plant for hours without seeing any insect visitor. On the other hand in the vicinity of this orchid certain trees (a Iacaranda and a Vitex) which bear blue flowers are visited by countless swarms of carpenter bees. These bees every day pass by clumps of Arundina speciosa, Bromheadia palustus and Vanda hookeriana without paying the slightest attention to the orchid flowers. The orchids in question were all growing in cultivated areas and thus to some extent under unnatural conditions but the same facts are revealed when we seek the plant at home: for there too the vast majority of flowers never set a pod. Nevertheless this does not apply to the small flowered orchids: such flowers are generally fertilised and it is quite a usual experience to find a complete spike of seed pods. This is to be attributed probably to the ants which frequent most flowers large or small in numbers: in small flowers an ant is able to remove the pollinia but in large flowers this is not possible.

In Sarawak the best known orchid is the Dendrobium crumenatum popularly known as the 'pigeon orchid.' It produces conspicuous spikes of sweet smelling white flowers which endure for one day only and then fade away: the spikes appear at irregular intervals of about 50 days. This orchid produces only very few seed pods: nevertheless it is visited by swarms of bees which pass rapidly from flower to flower removing the pollinia from many or all of the flowers on the spike. The pollinia are to be found on the metathorax of the bee dorsally. These bees (Apisdorsata) appear early in the morning and by 7 a.m. they crowd round the clumps of pigeon orchid found on almost every tree: by 8.30 a.m. however only few bees are to be seen and at 10 a.m. an occasional straggler is the sole representative of the early morning swarms. By evening (5 p.m.) the flowers have entirely lost their fragrant odour but they are still open and now they receive the attentions of a wasp (Vespa dorylloides) but as there remain only very few pollinia this wasp cannot be considered an important agent in effecting the fertilisation of Dendrobium crumenatum. In the morning smaller bees (Nomia elegans, a eratina and several Trigonas) accompany the Apis but they do not remove the pollinia and in fact one of them, (the eratina), does not trouble to enter the flower but pierces the base of the perianth tube and thus reaches the sweet liquid nectar.

In the case of the pigeon orchid the number of seed pods produced is surprisingly small. An experiment was undertaken to test the possibility for self-fertilisation.

1 'Self-fertilised' a number of flowers.
2 Crossed 2 flowers on the same spike.
3 Crossed 2 flowers from different lateral off shoots, arising from the same basal bulb.
4 Crossed 2 flowers on shoots from different bulbs in the same clump.
5 Crossed 2 flowers belonging to entirely different clumps.

The result was that only those belonging to class 5 set seeds shewing that for seed formation cross fertilisation in its limited sense is essential. This however is unusual amongst the orchids of Sarawak for most of them are capable of self-fertilisation. One of the most remarkable facts in the life-history of the pigeon orchid is the simultaneous flowering of all the plants in the same area. The flower spikes make their first appearance a week or so before the day of flowering, they all blossom on the same day, the next day they are faded and the series repeats itself at irregular intervals indefinitely: the point to note is that the intervals are of varying length of time and yet flowering is quite simultaneous throughout. This periodically corresponds with no known seasonal variation and until the flower spikes make their first appearance it is quite impossible to prophesy when the next pigeon orchid day will appear. Such are the main facts of the question but it is somewhat complicated by a more erratic flowering on the part of a few individuals. In the following table we give the dates of the pigeon orchid days in Kuching (Sarawak) during 1907 and 1908. For these dates we are indebted to J. E. A. Lewis Esq., who had a large collection of living orchids under continuous observation.

| | |
|---|---|
| Jan. 10. 07 | general (i.e. all the plants were in blossom) |
| Feb. 4. | general |
| Feb. 26. | general |
| May 1. | general |
| June 12. | fairly general |
| July 28. | general |
| Aug. 23. | sparse (i.e. only few in bloom) |
| Sept. 25. | very sparse |
| Oct. 19. | fairly general |
| Nov. 6. | general |
| Dec. 5. | fairly general |
| Jan. 26. 08 | general |
| Feb. 8. | sparse |
| Feb. 26. | very sparse |
| Feb. 29. | very sparse (only one or 2 spikes seen) |
| March 13. | only 2 plants seen in flower |
| April 14. | sparse |
| April 26. | general |
| May 25. | fairly general |
| June 14. | very sparse |
| Aug. 3. | general |
| Aug. 15. | very sparse |
| Sept. 9. | very sparse |

It will be seen that whilst some pigeon orchid days were characterised by a blossoming of all the plants in the area, on other days only a few plants were in flower: and although on the days marked very sparse we have several times noticed just a single flower spike standing alone yet on going to other parts of Kuching there too was found a sparse flowering. At first it seemed possible that in our neighbourhood there existed several series of pigeon orchids each series having its own period and in short that the orchids which blossomed on one sparse day would come into flower on another sparse day but would blossom on a full day. But such is not the case as we ascertained from several observations: for instance on Feb. 29. 08 one solitary flowering spike found in a large clump of pigeon orchids was marked and on May 25 when the clump produced its numerous spike this very same spike was in flower also. Mr. H. N. Ridley has stated that the pigeon orchid days of Singapore do not synchronise with those of Siam but if plants be brought from Siam to Singapore these introduced plants follow the Singapore dates behaving just like plants native to Singapore.

Now the general flowering of a number of individuals on one particular day cannot be accidental and it is evident that the flowering of Dendrobium crumenatum is not merely a habit induced by endless repetition from time immemorial but also that the species is in such exact relation to the climatic conditions of the environment that a certain series of external conditions produces precisely the same response in many or all of the orchids which are subjected to those conditions: and after all this phenomenon differs only in degree from the seasonal changes of plants in countries where seasons are well marked.

From observations on cultivated plants of all orders it appears that the bees of Sarawak affect particularly all blue flowers—the morning glory convolvulus for in instance is daily visited by swarms of bees, these mostly of small species however—and too they are attracted by fragrant flowers of any colour. Now none of the orchids are blue so that speaking generally the only orchid flowers that are visited by bees are such as have a fragrant odour. To this class belongs the aerides odoratum known in Sarawak as the 'Lingga orchid.' This orchid blooms once a year—in 1908 it flowered about the middle of January: the inflorescences are large and conspicuous and there is a fragrant odour. These flowers are visited by large numbers of the big black carpenter bee (Xylocopa latipes): they pass from flower to flower seeking the nectar and at the same time removing some pollinia. In the same neighbourhood there happened to be a big clump of sweet smelling pigeon orchids but these were passed by unnoticed. In the case of this aerides nearly all the flowers produced seed pods which is as I have already stated an uncommon occurrence for a large flowered orchid. By experiment I found that any flower could be fertilised by its own pollinia so that the chances of fertilisation are very much better than those of an orchid which like Dendrobium crumenatum must be cross fertilised.

Another very common orchid indigenous to Sarawak is the Arundina speciosa popularly called the 'Bau orchid.' According to Dr. Forbes this species has become so modified in Java that self-fertilisation without the intervention of any insect always takes place and all the flowers set seed pods. Now this never occurs in Sarawak though the flowers can be artificially self-fertilised ; ordinarily very few seed pods are formed on this orchid and fertilisation when it occurs at all is effected by insect visitors. Dr. Forbes statement has been recently confirmed by Mr. Smith of Buitenzorg who cites other instances of like phenomena viz : all the specimens of Tainia penangiana from Java and Ambon cultivated in the Buitenzorg gardens shew auto-fecundation but specimens sent over from Singapore and grown in Buitenzorg under exactly the same conditions are never self-fertilised :

Spathoglottis plicata from western Java is self-fertilised but a specimen from Ambon behaves differently: Phajus Blumei in Singapore is in some individuals self-fertilised and in others not so (H. N. Ridley) and Mr. Smith found the same thing in Java where the majority however are self-fertilised. It seems then that it is not very unusual to find orchids which in general floral structure are almost typical and which nevertheless are habitually self-fertilised without the help of insects all the flowers producing good seed pods; as regard those orchids which are dependent on insects the species which are capable of self-fertilisation set far more pods than those which must be cross fertilised. Further all the orchids have good method of vegetative reproduction though this will not effect a wide dispersal of the species except perhaps in such cases as Arundina speciosa whose lateral branches readily break off at the axils and could be carried long distances by violent winds. It is evident then that orchids are not so much dependent on cross-fertilisation for their propagation and dispersal as might be supposed from a study of the floral structure alone.

To return to Arundina speciosa: this has been under observation for months and on one occasion only a bee visitor was seen in the flowers. On Dec. 16.07 in the morning a solitary bee (Apis dorsata) was observed to enter the flowers of a large clump of this orchid: it visited about a dozen flowers spending about half a minute in each flower. Eventually it was captured and on the thorax posteriorly an accumulated heap of pollinia had collected. It is probable therefore that Arundina speciosa is occasionally fertilised by the agency of bees but nevertheless this is such a rare visitor that we must look elsewhere for the insect which is more usually responsible for the fertilisation of Arundina speciosa. And this is found to be the large skipper butterfly Erionota thrax which on certain evenings at about 6 p. m. pass with rapid flight from flower to flower spending a brief moment at each: sometimes pollinia are removed but often this is not the case. Between the dates Aug. 20.07 and Sept. 28.07 eleven plants were under careful examination. During this time 224 flowers were produced but only 15 capsules resulted.

Fertilisation took place only between the dates Sept. 2 and Sept. 21 as follows:

| | | | |
|---|---|---|---|
| Sept. 2 | 1 flower | Sept. 6 | 2 flowers |
| Sept. 13 | 3 flowers | Sept. 15 | 2 flowers |
| Sept. 17 | 3 flowers | Sept. 19 | 2 flowers |
| Sept. 21 | 2 flowers | | |

During this time the Skipper butterfly was observed in some numbers at dusk: the orchids which were fertilised were adjacent to a group of Banana plants on the leaves of which the caterpillars of Erionota feed. In this same period pollinia were removed in no less than 29 observed cases (there may perhaps have been more): sometimes these were noticed after heavy storms of rain and wind and in one case the pollinia had dropped on to the labellum in another case the pollinia cap had become detached and had caught on the stigmatic surface. Nevertheless no relationship can be found between the rainfall and fertilisation, and though self-fertilisation through the agency of storms is not the usual mode yet it may occasionally happen as the stigma is receptive to pollinia of the same flower.

It should be mentioned that the butterfly Erionota thrax, which effects the fertilisation of Arundina speciosa in Sarawak is a common insect in Java.

A few structural abnormalities were observed in these flowers: in one case half the labellum was normal and the other half was petaloid: in no less than three cases there were supernumary pollinia on the column each having a distinct pollinia cap. But there were no variations in the direction of auto-fecundation.

In a few isolated cases we have observed bees engaged on the flowers of orchids which have no fragrance: for instance Renanthera maingayi and alba of large showy but scentless flowers commonly cultivated in Sarawak are rarely fertilised and we have never seen insect visitors at the flowers but the Rev. John Perham assures us that the carpenter bees occasionally visit the flowers of R. maingayi: and on one occasion, at 6 p.m., we saw a single specimen of the bee apis dorsata very busy at the flowers of a large Cymbidium and the bee was found to have pollinia on the metathorax and yet these flowers are of dull red colour and are scentless.

# Story of the Burong Geruda and the Raja Merong Mahawangsa.

By Hon. R. N. Bland from the Kedah Annals.

After the war of Sri Rama and Raja Handuman, the Island of Langka Puri was deserted except by the bird "Geruda." The Geruda was a descendant of Raja Dewa. He was exceedingly wise and powerful. All birds and beasts feared him.

One day the Eagle came and said to him "Has the news "reached you O Geruda that the Raja of Rum is going to "marry his son to the daughter of the Emperor of China? "These countries are very far apart, one at the rising, the "other at the setting of the Sun; the sultan is sending his son "with a mighty fleet. They are even now weighing anchor and "setting sail. The Cockatoo gave me the news. He saw the "messengers who went backwards and forwards. Then I the "Eagle flew upwards and saw that his report was true." Then said the Geruda to the Eagle "Such arrogance can not be allowed and I will consult the Nabi Suleiman about it." So the Geruda flew to the throne of the Nabi Suleiman and told him what he had heard about the marriage of the prince and princess saying that such a match was not meet or fitting the countries being so far apart. Said the Nabi: "If it is the "will of Allah, no one can separate them." Then said the Geruda: "Give me this task and if I do not succeed let me "be banished from the sky, and the earth, and all abodes of "men." "Be it so," replied the Nabi, "do what is in your "power with this condition that you must tell me whatever "you do." Bowing before the throne, the bird Geruda promised and departed.

He flew far over the sea to the land of China. There he saw the princess playing in a garden with a companion and female servants. He swooped down, and carried off the princess and two attendants in his talons to the Island of Langka Puri. He placed them in his house and went off to find food for them. And whatever the Princess wished for, that did the bird Geruda obtain for her.

Now the Sultan (Raja) of Rum assembled the princes who stood crowned before him, together with his wise men and his officers and his guards and all his vassals in the great hall of his court and declared to them his intention of sending his son to the land of China. He commanded an expedition to be got ready with a fleet and enquired who he could trust to take his place as leader.

Now his friend Raja Merong Mahawangsa who was a royal prince, and who had married a princess sprung from the Indra and Gergasi fairies and Genii was present. He was esteemed very wise and valiant among all the Rajas. To him said the Raja of Rum: "Oh brother! will you go to marry my son to the daughter of the Chinese Emperor?" Then the Raja Merong Mahawangsa bowed low and said that he would do whatever his lord commanded.

Thus the ships were made ready, many vessels and kechis to accompany the prince. Then on a favourable day they took leave and made for the open sea.

So with anchors weighed and sails set they followed the ship (bhatra) of the prince, one half of Raja Merong Mahawangsa fleet behind, one half in front to lead the way to the Celestial land.

For a long time their voyage lay past the countries tributary to the great Raja of Rum, and from many broad rivers and from headlands, kings came to bring provisions and gifts to them. In course of time they came to the land of the Hindoos. There many strange and wondrous sights met their eyes. And they doubled many headlands and sailed through many bays, the appearance of their fleet being like a flock of birds seeking their nest, their masts like a forest of pepăra trees, and the whole sea resounded with the noise of their gongs and music.

Now when they had sailed as far as Kuala Chingkong, the name of whose Raja was Klanggi, the face of the sun became darkened, and it seemed as if a storm were about to descend on them.

The ships drew near together, and the Raja Merong Mahawangsa going up on deck with his weapons saw that it was not a storm but an immense bird coming down on them, whose wings made a noise like the rushing of a hurricane.

For two days the fight with the bird Geruda went on. The ships received it with volleys of arrows and cannon shots. Raja Merong Mahawangsa on the first day brought forth his bow "Aiyounan" and the wondrous flame-tipped arrows. These he sent hustling into the air, and straightway they speed with a noise like rolling thunder, as it were a mountain come down, to overwhelm the Geruda, but he swiftly flying evaded them. Neither cared he for the other missiles, they glanced off harmlessly and fell into the sea, neither could Raja Merong Mahawangsa hit him on account of his swiftness.

On the second day the bird Geruda attacked again. In vain did Raja Merong Mahawangsa draw against him the bow *Bran Pura.* The fire-tipped arrows flew upwards with a noise like thunder and causing darkness as astorm of wind and rain, but they were all lost, nothing could wound the Geruda, even with the assistance of the Genii and air sprites. With beak and talons he seized six ships, scattering their crews into the sea, or letting them fall on the land.

Then night came on, and the ships clustered together for mutual defence during the night. In the morning they repaired their shattered rigging and searched for some trace of their companions. But the sea gave up nothing, so after many days they sailed on. And when they had traced the mouth of the river, whose name is Marib, again they perceived a terrible darkness growing in the sky with a noise of wind and rain and fearful roaring. Then their hearts sank, but nevertheless they moored the ships and prepared to once more receive the Geruda with missiles and arrows. These, as before, were of no avail. When the Raja Merong Mahawangsa saw that the Geruda was coming down on them, he took his third bow, whose name was *Perasa Simpani Gambera*, and putting one of his flame tipped arrows to the string he said "O Perasa Simpani Gambera, go forth and destory the Geruda." Then the arrow flew through the clouds and straightway a troop of Jins and Shaitans appeared to assist against the Geruda. But the bird cared not for them nor was his heart daunted. Swooping down he carried off many ships in his beak and claws, either plunging their crews into the sea or dashing them down amongst the lofty forest trees, so that their bodies were scattered in fragments and utterly destroyed.

At this great was the anger of the Raja Merong Mahawangsa. With another arrow he shot at the Geruda, and the sky and sea were filled with a noise like rolling thunder. This time the arrow took the form of the bird Jentaigu, rushing to attack the bird Geruda. Now ensued a desperate struggle, the birds fighting with beak and talons. At last the Jentaigu was overcome by the flames breathed out by the Geruda, and, as an arrow, returned to the quiver of Raja Merong Mahawangsa. Thus night fell and the fleet was for a time left unmolested by the bird Geruda. And in the morning seeing that the Geruda did not come, they weighed anchor and sailed on. And after sailing for several days they arrived at *Pulau Selang.* In the meantime the Geruda had retired to a lofty mountain and was planning how to destroy the whole fleet, for he feared Raja Merong Mahawangsa, who was indeed the bravest and most skilful chief of his time.

Now when the fleet had reached the Island of Selang, they stood in need of wood and water and Raja Merong Mahawangsa was deputed by the Prince to land and fetch it, while the rest of the fleet sailed on. And sailing on they came to the Island of Langka Puri. There, during the night time, they were attacked by the Geruda who had no longer to fear Raja Merong Mahawangsa. The fleet was utterly destroyed. The Prince however, survived. He found himself floating on the water, clinging to a loose plank alone in the wide sea, without food, at the mercy of wind and waves.

When Raja Merong Mahawangsa had taken in wood and water, he set sail to rejoin the Prince at day break. Presently he came to the spot where the Geruda had destroyed the fleet. There he found a few men still swimming about, these he picked up and learned from them what had happened. For many days he searched for the Prince, then not finding him he sailed on with his people till they reached the Islands named Seraya, Jambul and Lada. A little further on lay the mainland for with they steered. There the Raja landed and was welcomed by the Genii and other supernatural inhabitants of that land. They at length invited the Raja to become their ruler by reason of his valour and the nobleness of his language. There they built a palace and a fortress for him, and his people with their wives and families formed a kampong or village around. And in a short time the kingdom thus founded became prosperous and powerful. Many people came to settle amongst them and from all lands to trade with them.

In the meantime, the Prince was left swimming alone in the sea on his plank.

For several days he drifted, borne along by winds and currents. He had neither food nor drink, the sun beat on him, the waves buffeted him, his body became all covered over with mussels and limpets. At last he was washed ashore on the shore of Langka Puri. Lying in a cranny of the rocks, he was too exhausted to speak or move, he could only groan.

Now the Chinese Princess with her attendants had been carried off to this very Island of Langka Puri by the Geruda, and it happened that when the Prince of Rum was thrown upon the coast, the Geruda was away finding food, while the Princess and her nurse had come down to the shore to look for shells and crabs and coral; suddenly they heard a noise of groaning, and the Princess bade her nurse go and see what the noise was. She was terribly frightened when looking over some rocks she saw a strange thing like a man, but with a body all covered with sea weeds and limpet. She did not stay to look twice, but ran straight back to the Princess to tell her what she had seen. She declared she could not tell whether it were a man or an evil spirit. Then the Princess smiled and bade her go back and not be afraid, but find out whether it were a man or not and bring back word. So the nurse went and took courage to approach and speak to the Prince, who slowly and with difficulty told her who he was and what had happened to him. When the nurse heard this she felt very sorry for him and returning told the Princess. Then the Princess was glad indeed and with the help of the two attendants she bore the poor Prince and hid him in a cave lest the Geruda should find him, and she told the nurse to give him a bath and scrape the shells off his body and to be careful not to give him rice at first, but only rice water until his stomach should be stronger. And towards evening they piled up stones before the cave and left him for fear the Geruda should find him on its return.

Now it was the Geruda's custom to leave the Island of Langka Puri every morning in search of food, returning only at nightfall; thus it was possible for the Princess's attendants to visit the Prince in his cave every day, to nurse him and bring him food. And after a short time the Prince recovered, and the nurse reported to her mistress that he was superior to the princes of all other countries in appearance and manners, but that he was sadly in want of clothes. So the Princess thought of a plan. When the Geruda returned at evening she addressed him, "Oh, my father, you have brought us here and are always taking pains to get us what we want, but there is something more I wish for. I have left all my clothes behind. There is in my father's palace in China a room set round with mirrors, and in it a chest hinged with ivory and set with emeralds. In this chest are all my clothes. Will you, oh father, go and get it for me?" The Geruda replied that he would gladly and immediately set out.

So the Geruda flew away till he came near the Emperor's palace when he caused a storm of wind and rain and darkness to come on which shook the whole building and roared horribly overhead. Then the Emperor and his great men who were feasting inside were terribly frightened. They began to tremble, and no man knew what to do or what was going to happen. However, the Geruda did not do them any harm, but simply pulled down part of the wall of the palace and put in his head and seized the box as the Princess had told him, and flew away with it back to Langka Puri. The Princess was not a little glad to get back her box; she pulled out all the things and looked at them and choosing some of the best she gave them to her nurse to take to the Prince, as soon as the Geruda should be out of the way.

At last the Prince was fit to meet the Princess, and dressed out in his fine clothes like a Raja the Princess thought she had never seen a young Prince like him.

So they embraced and kissed each other, and sat hand in hand, dreading the time when they would have to separate for fear of the Geruda. But there was no help for it—at evening they had to go, both weeping and lamenting their sad condition. Thus day after day, till at last the Geruda told the Princess that he was going to present himself before the Nabi Suleiman and that she must behave well in his absence. When after flying for many days, the Geruda arrived before the throne of the Nabi Suleiman bending low he told him how he had prevented the marriage of the son of the Sultan of Rum with the daughter of the Emperor of China, and whatever else had happened. Then said the Nabi: "But suppose the Prince of Rum should be alive, what then O Geruda?" The Geruda answered: "Should this be so and the Prince meet the Princess O Nabi, let the former vow take effect, let me depart from all the habitations of men and from beneath the sky, and from the face of the round world." At this the Nabi smiled and bade him who ruled over the Imps or Spirits and whose name was Herman Shah take 100 of his Imps and mentris and fly off to Langka Puri, to seize whomsoever they might find there, put them into a large box and bring them back at once. On their return, the Nabi ordered the box to be opened in his presence and that of the Geruda. Out came the Prince of Rum, the Princess of China and the two attendants!

Then said the Nabi Suleiman to the Geruda; "Listen O Geruda, and all ye Rajas, warriors and subjects. From this ye may learn that whatever Allah has decreed will surely come to pass. He provides for all mankind, and watches over their affairs and because, O Geruda you have not believed this and have tried to thwart the design of Allah with regard to the son of the Raja of Rum and the daughter of the Raja of China, I now banish you to the sea called Kolzum (Red Sea) to which mankind cannot approach."

The Geruda replied: "If this is the command of the Nabi Suleiman, I obey," and straightway he flew away in the direction of the Sea of Kolzum where he remains to this day.

Then the Nabi Suleiman commanded his mentris to prepare letters in the language of the Imps addressed to the Raja of Rum and the Emperor of China, to inform them of all that had happened to their children, and at the wish of the Prince of Rum he directed the Raja to recall Raja Merong Mahawangsa who had founded a Kingdom on the Island of Seraya. The letters having been written and addressed in the proper style, the Nabi commanded Hermanshah to proceed with his jins and mentris to the Court of the Emperor of China taking the Prince and Princess and their attendants with them.

Now the Emperor of China was in his Hall of Audience, consulting with his mentris and chief officers, hulubalangs, sidasidas etc., as to what reply should be sent back to the Raja of Rum by the messengers who had come to obtain news of the Prince and Princess. Suddenly the Mangkabumi (Chamberlain) saw Herman Shah, the Raja of the Jins appearing on the threshold. Going forward great was his surprise to learn his name and mission. Taking him by the hand he led him before the Emperor who rose from his seat as a sign of honour. Then Herman Shah presented the letters from the Nabi Suleiman and caused the box containing the Prince and Princess to be brought before His Majesty. The letter having been honoured with all proper ceremony, it was read out by the Mangkabumi. And when the letters had been read the box was opened and the Prince and Princess appeared before the Emperor. Then was the Emperor glad, he kissed and embraced his daughter and was highly delighted with the appearance of the young Prince. So a feast was prepared and all the Jins and ambassadors and nobles were entertained, and the Emperor sent word throughout all his Empire and its tributaries to prepare to celebrate the marriage of the Prince and Princess as the Nabi Suleiman had commanded. And the ambassadors were directed to return to inform the Raja of Rum of the happy ending of his son's adventures.

# My Trip to Bĕlum.

BY E. W. BIRCH, C.M.G.

We started from Grit for Bĕlum on Monday, the 26th July. Hubert Berkeley, J. W. Simmons, the Datoh Sri Adika Raja, I.S.O., the hereditary Chief of Upper Perak, and I.

We had 21 elephants, one of which is probably the tallest in Perak. He is named Bogek and stands 9 ft. 4¼ ins. at the shoulder. His master, the Datoh Wan Man—the headman of the district for which we were bound—had come down to Grit to meet me and was our guide to Bĕlum.

We began our journey by walking eight miles to Bersiah, where we camped. The elephants took over seven hours to make the journey. They can go two miles an hour when the going is good, but deep mud, hills, river fords and fallen trees delay them. At ¼ past 12 we reached Kuala Rui and saw how it empties its muddy water, full of mining silt, into the beautiful Perak river.

We passed through bamboo country and crossed some fair-sized streams.

Bersiah is a village with 64 people of all ages, who live in miserable bamboo huts and have but little cultivation of a permanent nature. The evil of opium smoking is very evident amongst the Patani Malays here and elsewhere and destroys their usefulness as agriculturists. There is some padi land, and some more will be irrigated next year at Banderiang, on the Grit side of Bersiah.

The people suffer a great deal from goitre (*bengok*), and this was more noticeable the further we went up country. The Datoh Sri Adika Raja tells me that goitre is a peculiarity of the interior of all the surrounding Malayan countries as one nears the mountains: and that the Malays attribute it to the water the people drink. They believe that the water is infected by some unknown *akar* (root or creeper).

Jour. Straits Branch R. A. Soc., No. 54, 1909.

On the 27th, we broke camp at 7.30 a.m., and reached Kuala Temengor at 2.50. The scenery on the river here is beautiful. We went on up the Temengor river and camped at Dusun Memalik at 3·35.

The Temengor here is bigger and carries a larger volume of water than the Batang Padang river at Tapah. As we turned into Dusun Memalik, some of our men saw a tiger on the path but it did not visit our camp, having been frightened away probably by our elephants. One of the Chinese cooks was suffering so badly from fever that we sent him down on a raft to Kuala Kendrong, two miles from Grit. He is an opium smoker.

We wake up on the 28th to find it raining, and when we broke camp at 8.30 a.m., Berkeley and I walked on to Berusong, 1½ miles. We waited for the elephants at the turn off of the Temengor path. It is nine miles from there to the village of the Mengkong of Temengor. We followed up the Kelantan path on elephants, the rain having fortunately stopped. There are few more uncomfortable experiences than to travel slowly on elephants when it is raining. Malays say that in elephant travelling there are three things to avoid—darkness, rain and camping near cultivation.

We had to run the risk of the last of these evils more than once and had to pay trifling sums for what the elephants ate. It is extraordinary that they don't do more damage. They are bathed on arrival at a camp, turned loose with a chain on one leg which they drag about after them, their *gembalas* (mahout) visit them when near cultivation before dark and find them again at daybreak when they are again bathed and saddled. Their wooden bells (*kerotok*) and the cracking of bamboos tell their whereabouts, and are the only noises one hears in the stillness of the forest nights. In my walk of 1½ miles to Berusong I picked 34 leeches off my legs, but that was a trifle to what we experienced later.

Berusong is the field of old gold workings of ages ago, but people still hold land there. That gold is there no one doubts, but the water difficulty prevents systematic working. We passed through some fine forest with good merbau trees. No one cuts them, for no one has need of timber up here. We kept the Perak river on our left, at a distance of about five miles all the way and camped at 5 p.m., on the Singor river at Kuala Bubong. The Singor is a fine river with a considerable volume of water and may be compared for size to the Plus.

Our camp was on the habitat of *semut api* (a large black ant), which bites painfully and is feared by Malays. A good deal of sweeping and some kerosene oil drove them away.

Just before we reached our camping ground, an accident, which might have been serious but was fortunately only laughable, occurred. Simmons and our Chaplain (Haji Hamat) were riding on Meh Mas (the golden girl), and she was being immediately followed by Bogek up a steepish bank.

Bogek is a queer-tempered elephant, and as Meh Mas was climbing too slowly to please him, he dug her in the rump with his tusks and over she rolled. Her small gembala and the two occupants of her saddle (*rengka*) were thrown out but luckily without bruises.

On the 29th, we broke camp at 8 a.m., and travelled on elephants up the Singor river through pleasing scenery as far as Pineris, which we reached at 10 a.m. Just before we got there, we saw a most magnificent *ara* tree *(ficus)* on the opposite bank. I have rarely seen a better specimen.

All the people have left Pineris and moved to Banding on the Perak river. It seems a great pity that a place so beautifully situated and so well planted up should have been deserted. There is padi land below it, but not sufficient water for regular irrigation, and it has never been tilled. The settlement was formed in 1904 to check the raids of Legeh men who came in to look for *kayu gaharu*,* and in that direction it was successful. Berkeley gave the settlers poultry and seedlings, appointed an Assistant Penghulu, and built a halting bungalow and school. But the first year locusts ate most of their crop of hill padi *(huma)*; and for the next two or three years the ear of the corn was empty. This so disheartened them that, when the transfer of the upper country began to be talked about, they asked leave to move over the border to Banding. The school is about to be moved there now. From Pineris to the Kelantan border the distance is 30 miles, and there is a good path most of the way. We left Pineris and the Singor river at 10.35. The path was rather overgrown, and I applied the golok (cutting knife) vigorously to overhanging branches, when, to my sorrow, I cut into the nest of *penyengat* (wasp), and quicker than anything else but lightning I received ten stings distributed over my right ear, my right-hand and both ankles. The pain was intense for a few minutes and was followed by a feeling of numbness. Soon we came upon some truly magnificent trees of wild cotton (*kekabu hutan*). They were from 16 to 20 feet in circumference, straight for 150 feet and plentifully topped with leaves very like those of the ordinary cotton tree. The cotton which these trees yield is said to be peculiarly soft. We got into camp at Sungei Banun at 2.30.

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* This scented agila-wood is found in the heart of one or two trees generally in the tengkaras (Malay) or depu (Patani).

From 3 to 4 p.m., Berkeley and I sat in the *sira banun* (sulphur spring) and waited for big game but it was a hopeless wait from the first, for the bells of our elephants must have driven all game away. We saw the marks, very fresh, of an immense elephant, and it was not long before we were to hear of him.

We netted a beautiful *kelak*, the best of our river fish, for dinner.

At 1 a.m., on the 30th, I awoke with a racking headache and stayed awake till coffee was ready at 4.20 a.m. I had unmistakable signs of fever on me, so took quinine and determined to walk it off. At 7.30 Simmons and I left camp, and guided by Datoh Wan Man, walked six miles to Kuala Kriong on the Perak river. We got there at 10.30 in bright sunshine, waded across the river and selected a small stone *tanjong* or bank for a camp.

We encountered leeches innumerable on our walk, and had to stop every few yards to pick them off. The remaining

Chinese cook walked behind me and was very busy and useful all the way.

At noon Berkeley came in, saying that three of our female elephants had followed a wild tusker—undoubtedly the one whose marks we had seen at the *sira*—and that he had left Saiyid Wahab and three gembalas behind to try to catch them. A little later the Saiyid came in looking very white. The tusker had chased him. He had fired in the air and then managed, just in time, to crawl under some fallen logs.

Alang Sagor, the chief gembala of Datoh Wahab (the Penghulu of Sungei Raia in Kinta), in his frantic haste to get away had fallen on to a log and fractured his right-arm, half way between the wrist and the elbow. He and the other two gembalas had come in with Saiyid Wahab.

Berkeley very skilfully set Alang Sagor's arm in bamboo splints, but, at his request, took off the splint; for Datoh Wan Man had some *jadam* (asafœtida) in his bundle, and that applied with boiling water forms a sort of a plaster. That done, Berkeley rebound the arm in splints, and when two days later we left Alang Sagor, and another gembala, Ismail, who was suffering from fever, at Tapong, he told me that his arm felt quite easy.

It rained incessantly all that afternoon and until after we went to bed, but I personally slept for nine hours and woke up at 5 a.m., with my fever gone.

The three missing elephants belonged, one to Datoh Wahab, one to Raja Harun, and one to the young Datoh Muda of Kinta, Berkeley sent away four *gembalas* from Kriong to catch them.

On the 31st July, Simmons and I, with Datoh Wan Man, the leech-removing cook, and half a dozen men, crossed the river on elephants and began our walk to Tapong at 7.20 a.m. We immediately came upon the tracks of the wild tusker. Datoh Wan Man told us that the elephant had left the females and crossed the Perak river in the night to where our remaining 18 elephants were turned loose. One of our *gembalas*, going at dawn to catch his elephant, saw the tusker and in running away fell down and hurt his back but not seriously. Wan Man was sure that the tusker was still across the river, but enjoined upon us the advisability of strict silence. We followed his gigantic tracks for half a mile up the Tapong path and then sure enough found that he had turned back to cross the river. So we walked on with quicker steps and unconstrained tongues, meeting with uncountable leeches, which kept us both, and indeed all the party, continuously occupied.

We walked through two *sira* and reached Perenggan at 10 a.m.* We found that Wan Husein was encamped there, but he had gone to visit some Sakai, so Simmons and I, with our party, pushed on, on small bamboo rafts, one mile up-river to Tapong.

The kampongs are all deserted at Tapong and the people have moved down to Perenggan, where there are now 39 of them.

But we found a delightful white-sand bank on which the sun was blazing. We had taken the precaution to bring all our washed and wet clothes in two bundles and we spread them out and completely dried everything by the time (1.30 p.m.) Berkeley came in with the elephants. As soon as the tents were pitched the cast-nets were at work and we got quite a good catch.

The bank on which we camped was covered with *bayam pasir* (sand spinach) in full blossom. The flower is like an everlasting, ranging from pink to magenta in colour.

Wan Husein paid us a visit and chatted, and the Tapong people came up to sell fowls and fruit, and were commissioned to make five rafts for us to be ready for our return journey down river.

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* This old boundary of a hundred years ago is always described in the Malay Saw—"*Batu belah kekabu hutan Padang Limau Nipis.*" We saw the split rock (a poor specimen) left by a Sultan's sword, but the wild cotton tree had disappeared. It shed white blossoms on the Perak side and red on the Patani side. The other boundary referred to, Padang Limau Nipis, is not now part of Perak.

On the 1st August, we left the best camp we had so far found at ¼ to 8. We crossed the river at once on elephants, entered some *belukar* (secondary growth) and lost our way. We took nearly an hour to find it.

The midges were terribly annoying, a species called *rengit.* It would be quite improper to put on paper the only language in which they were fitly described. We forded the Perak river six times, and near one of the crossings Berkeley told us the story of the death of Mengkong Gos. He lived about 80 years ago, and was a well-known Patani Chief. He gave offence to the Raja of Reman because of his friendly attitude to Perak people. The Raja sent for him and at the little lalang patch at Bruah he met the Raja's messenger. They both got off their elephants to shake hands and, while the Reman man gripped the old Mengkong's hand, a Chinese Mualaf (convert to Islamism), stabbed the Mengkong from behind. The kris bent double, and the old chief, seeing that his life must be taken, said: "No kris can kill me unless I *jampi* it" (imbue it with magical power). He then took the kris in his hands and straightened it out. When he had done so, he handed it back to the Mualaf who stabbed him. So the legend goes: it is a good story, but the Mengkong seems to have sought his fate. He was the great-grandfather of the present Mengkong of Temengor.

We reached camp at Tronoh at 3 p.m. when Husein pitched his tent on the river bank, but we all set up ours on a stony island and there made the acquaintance of yet another insect. It is called *tungau* (sand-tick), and is most diminutive. Bright red in colour, it looks exactly like a grain of Cayenne pepper. It invades your person and proceeds without delay to bury itself under the skin. It is difficult to see, and more difficult to pick out. It is said to feed for about four days and then work itself out and drop off. Meanwhile, as most of our party can vouch from experience, it is itchy. It does not deserve to be spoken of in nicer language.

Berkeley and the Datoh Sri Adika Raja went out fishing and their success compensated us for small evils.

On the 2nd August, we left our camp at 7.45 a.m., and at once got into the open out Jeram Kekua (a fine rapid). Here there is a wide rocky bay with very slippery going for elephants. Kulop Bintang fell and split both his tusks. Our little enemies, the *rengit,* were most persistent. At 8.45 we skirted Lobok Panjang (the long pool). The Perak river runs quite straight and deep here for some three-quarters of a mile between high banks.

We seemed to be steadily climbing. At 11.15 we crossed a fine clear stream of some size, the Sungei Tahan, and later crossed the main river five times. Near one crossing, Manik, we came on the spot where one of Mr. Caulfeild's camp followers was taken in 1884 by a tiger out of an elephant's *kop* (howdah) in the middle of the camp. It is a tiger country, and many are the tales told of how man-eaters have killed people in the past.

We went on further than we had intended, passed Jakat without knowing it, and camped at 3.20 p.m., in a place that was not inviting. A species of cobra and an *ular matahari* (a beautiful but poisonous whipcord snake) were killed within a foot of each other where my tent was being pitched, and when the ground for Simmons' tent was being prepared, a few minutes later, a small *ular matahari* was killed. It is very rarely that one sees snakes in big jungle, so this incident is quite remarkable.

While we were all bathing in the river, we heard elephants trumpeting, and the gembalas were sent off to see what had happened. Bogek was tethered, but Kulop Chandan, a big tusker of the Sultan's, passed within the length of his chain and received two pokes in the neighbourhood of his tail. Berkeley examined the marks but decided that they were not serious.

On the 3rd August, Simmons and I left camp at 7.15 a.m., and rode on Meh Mas as far as the Rest-house, which Wan Husein has established at Tunggul Burok (the rotten stump). There we got off at 9.20, and led by Datoh Wan Man and followed by the Chinese cook and Simmons' Malay boy (a Saiong man), we commenced to walk into Bĕlum. We crossed at least seven respectable streams, so it is not to be wondered at that the Perak river carries down from its ulu a fine body of water and that heavy rains easily create floods. The first part of our walk was along an excellent path and in open bamboo country,* and we strode on in good spirits. Mine were presently damped, for I did not see an overhanging tree above the path, and a very solid one at that. I walked straight into it with my head and was almost stunned. Then we began to climb a hill and, at the worst point, I heard an exclamation from behind and saw Simmons clap his left-hand to his left ear apparently. I said "hornets" to the old Datoh and we did an excellent sprint up the hill followed by Simmons, the cook who had been stung in the hand, and the boy who was apparently in as much pain as if he too had been stung. We ran up into some lalang, and as I saw a patch of jungle on the right where there was shade, I urged the Datoh to run into it and we all followed. We hoped that the hornets would go on up the path and that we should escape. We were breathless and wanted a rest. When Simmons came in, I saw he was bleeding freely behind the ear. I was just going to suggest whisky as a remedy applied locally (I had a flask), when he said: "There is one of them on you." We all immediately bolted into the lalang and down the path. Some 200 yards further on we entered jungle and Simmons saw one sitting on my leather belt. He crushed it with a walking stick. We picked it up off the ground and beheaded it on a log. Then only did I see that it was not an ordinary hornet (*tebuwan*), but a *panahliang*.† This fearsome hornet, the worst of all stinging insects in Malaya, is fortunately

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*W. G. Maxwell, in his delightful book "In Malay Forests," makes too much, if I may say so, of the gloom or impenetrable darkness of the forest. In *belukar*, where elephants chiefly feed and in swampy places which the rhinoceros haunts, I grant that his description is correct. But in old forest one can not only see for some little distance, but can make one's way.

† From panah—an arrow, and liang—a hole in the ground. This species of hornet makes its nest in a hole in the ground. If you tread on or disturb its nest, it darts at you like an arrow out of the hole.

uncommon. Its yellow band is lighter than the orange of the hornet. Its wing is more gauzy and browner than the *tebuwan's* wing. Its bite is said to produce fever, and quinine is always asked for if a white man is near by. It is reputed that six will kill a man, from ten to twenty a buffalo, while quite a few will make an elephant do what we did—*i.e.*, run. It is said that for a radius of four feet round their nest all vegetation is killed. I am a lucky person to have had two settle on me and yet not have been stung. Simmons' neck continued to bleed, but, soon after he was stung, we overtook Wan Husein on an elephant. He produced a bottle of Siamese medicine, menthol and peppermint, with a odour of snuff, which gave great relief. Wan Husein's gembala was stung under the left eye and the poor man's face was terribly swollen. Later, when our elephants came in, we heard that five or six men had been stung. Berkeley escaped by making his elephant walk at a funeral pace, a rate of progression to which the *panahliang* is quite unaccustomed.

We got a good view of Ateng, a fine hill about five miles off. We then went down to the river bank and goat-walked for about a mile. It was not till 1.10 p.m., after four hours' hard walking, that we reached Lembu—the first village in Bĕlum. The water of young cocoanuts was greedily drunk. There are only 13 people in the village. One hundred yards further on is Kubong Rengit (the pond of the sandfly) with eight inhabitants. A quarter of a mile along the padi-fields we came to an ideal camping ground on a high bank over the Perak river, with short grass shaded by *angsana* (*pterocarpus*) trees. We all camped there on Tuesday and decided to stay till Friday morning, so as to rest our elephants and see the people of the eight villages. The elephants had travelled on an average for seven hours a day, which is as much as can be expected of them. At 5 p.m., I took my gun out and got a right and left at jungle fowl, bagging both. There is a clearing at Tandok close to our camp, one house with two people.

On the 4th August, at 5.30., I was up for coffee and went out with my gun. I had two shots at jungle fowl but only bagged one. I walked on to Lapang Hanyir (open land with a sour smell), which is the Datoh Wan Man's chief residence. His wife is a leper. There are 23 people in the village. The padi-fields are terraced, and years ago there must have lived a clever native engineer who irrigated all these fields, bringing water from the Maka river through a deep cutting. Later in the day the people of Belimbing (on both banks of the river), of Kĕbeng and of Grêh came in and from their lips I took a census, which showed 27 males, 29 females and 69 children, or 125 in all, in those villages. We had a long talk with the Imam, whom I confirmed in his office, and told the people to build a mosque and school at Maka, as it seems the most central place. We procured two goats and a buffalo for a feast for the village people and for our camp followers. All the debt slaves (16), except two, were brought before me, and I told them that their owners had been paid and that they were emancipated. Wan Husein had told all the villagers that they had been transferred to Perak from the protection of Siam, and I explained to them the lines of our administration. They said they would try to recall the people who had left their orchards and rice fields: they complained of the great difficulty in obtaining blachan and salt, but of rice they grew more than enough. They brought us in a quantity of fowls and very good rice. These people are at least 70 miles from Grit. There is no possibility of regularly supplying their wants, except by sending up an elephant once a month. If a Chinese shopkeeper can be induced to settle here he could do it, but as opium smoking is not practised in Bĕlum, he should not be allowed to take opium up country. The whole population is about 206.

There is no prospect of planting in this district. The cost of transport would be in itself prohibitive.

Bĕlum stands at an elevation of over 1,500 feet above the sea, and has a healthy climate. But it is sad to see so many people, especially the young, afflicted with goitre. There are few mosquitoes and but little fever. It is quite a nice place when you get there. The journey is the rub.

On Thursday, the 4th August, Wan Husein went back to Betong. He showed me Hedgeland's map, with the new boundary marked on it, at Bangkok. He has been very friendly.

We left Bĕlum on our return journey at 8 a.m., on Friday, the 6th August, and reached the rafts (*rakit rembau*) at 3 p.m., on the 7th at a place called Lobok Jerai (the pool of the *ara* tree). They were very comfortable and we slept on them. Sixteen bamboos are tied together with rattan: they form the main deck, 48 feet long by 5½ feet wide. Under them are lashed five pairs of bamboos to raise the deck and also to act as a fender to it. In the centre of the deck is built the *rumah* or house, 11 by 5½ feet. It is raised 15 inches off the main deck by three bamboos crosswise, resting on three length-wise, and on the top is a flat flooring of split bamboo. Sticks are tied on to the sides of the house and a tent hung over them forms the roof. Five men pole them, one of whom in the bow is chosen for his intimate knowledge of the rapids which have to be negotiated.

Before dinner the cast-net was taken out and 35 fish were caught, a large and two small *kelak*, some *rong*, *tengalan* and *krai*.

On the 8th August, I got off in the leading raft at 7.30., saw a deer which one of the men frightened away by shouting, and had a long shot at and missed a jungle fowl. It was a cloudy, cool morning with a fresh breeze, and the scenery, together with the excitement of the rapids, was quite entrancing. We went over sixteen rapids before we got to Tapong 10.45 and Perenggan 11.10. Only one of them was really exhilarating—Jeran Bruah. You go down it in two big jumps. It is half way between and close to two rivers. The upper is Sungei Klian Mas (the river of the gold mine), and is so called because a number of Chinese were mining there years ago. There is doubtless gold still left. The other, Sungei Tiang, is quite a respectable stream. Five or six miles up it there are abandoned orchards of durians and cocoanuts, which are said to belong to the Mengkong of Temengor.

At Perenggan, one of our runaway elephants, the one belonging to Raja Harun, was feeding. It had been caught at the Rest-house at Pineris, and the other two had been heard of at Dusun Memalik. They were all evidently on their way back home, but Rana was outpaced by the others, because she had hobbles on her hind feet.

It is a well-known fact that the *ungka* (*Hylobates concolor*) and *siamang* (*Hylobates syndactylus*) inhabit different banks of the Perak river: the former the true right bank and the latter the true left bank. After a great battle they came to this sensible arrangement on the two huge rocks about two miles above Kuala Kendrong. It is evident that the treaty did not extend to the higher reaches of the river, for in my journey I heard the cry or song of the wah-wah (*ungka*) on both banks. I was able to collect the seed beans of the beautiful creeping bauhinia, which covers so many jungle trees with its scarlet and orange blossoms. The Malays call it *dedaup*. Both banks have a fine lily growing by the water's edge. The Malays give it the somewhat generic name of *pechah periyok*. It has many beautiful split white flowers on a long stalk. I collected a few bulbs.*

We left Perenggan at 12.20 and met the Assistant Penghulu of Temengor coming up on a small raft to escort us. I took him on my raft. After passing over eight more rapids, we tied up at 3.15 p.m., to a sand bank opposite Sungei Ta-ar.

On the 9th August—the seventh anniversary of the Coronation of King Edward VII—we were off at 7.45 a.m. The Datoh Sri Adika Raja had gone on in his raft an hour before us, and by so doing saved us an hour's delay, for when we arrived at Jeram Goring at 8.30, he had not yet finished cutting away the overhanging branches on the left bank of the river which make this rapid difficult to negotiate. It was a fine rush through the water. Berkeley's raft stuck for two or three minutes in the approach to it. I had two high shots at *pergam* (the imperial pigeon), shot two grey hawks, saw a beautiful *serigala* (jackal) like a red fox, heard the cry of the Argus pheasant (*kuwang raya*) several times, and was interested to watch about a dozen little birds (*merbah*) dipping down repeatedly from low branches to take their bath in the river. They were not after food but were just half diving into the water. At 11 a.m., we reached the Seniang rapid, and as ours was the leading raft, we stopped and took 20 minutes to cut away overhanging branches. Then, we plunged through. It was quite exciting. We reached Kuala Kedah at 12.20 and landed at Haji Mudin's kampong at Banding ten minutes later. This is the new settlement to which the people from Pineris have migrated. It can be watered as far as Palut for irrigation purposes from the Kedah it is said, but it should be thoroughly examined by a Public Works Officer before these poor people are induced to make a second settlement. With the help of Haji Mudin and the Assistant Penghulu, I made a census and found that there were 51 people of both sexes and all ages. I walked through the clearings and met a number of Sakai of the Kunchiau tribe (about 20 men, women and children), all with short curly hair. One fine young fellow stood 5 feet 10 inches, but the others were short though not diminutive. Three of the women had tiny babes at the breast. They tried to run away when they saw me, but we induced them to come back and chat. In the old days the Rajas used to take their children to be slaves, and sometimes, of course, the parents, if they resisted, were killed. We left Banding at 1.35 p.m., negotiated the Palut rapid which is rather nice, passed Bukit Tali Kail (hill of the fishing line)—the boundary laid down in the Siamese Treaty of 1899 and marked with a stone—and went on to Jeram Chenoh. We reached it at 3.15 and dashed through it. It is a fine jump down one ledge, but the water did not wet the rumah rakit. At 3.40 we passed the mouth of the Singor. This fine river, which I have previously mentioned, empties itself into the Perak at a rocky delta. The chief part of the stream comes surging through rocks not more than 20 feet apart. After having passed over 25 rapids, we stopped for the night opposite Kuala Rengkam. It was 4.45, and the men had had a long day. Our last rapid (Jeram Maya) was exhilarating, the waves being larger than we had so far encountered.

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* Doubtless *Crinum defixum*, H. N. R.

We saw some small rafts, those used to pole up-stream, at Banding. They are called *lantin*, and differ materially from the *rakit*. In the latter the bottom or thick end of the bamboos are in the bow. In the former the tops or thin end are in front. The number of bamboos used in a lantin is always an odd number. It varies from five to eleven. In the middle is a small raised bench with a handrail on each side. A *lantin* is about the same length, but not quite so long as a *rakit*. The centre bamboo is the longest and the others are each in turn shorter than one another. When green, the bamboos are lashed together, and both ends are raised by being rested on logs or on higher ground: the centre is then heavily weighted with stones, with the result that a good sheer is given to the raft.

The Datoh and I were off at 6.15 a.m., on the 10th August, and the early morning air was delightful. The men saw a *bachang* tree (a species of mango) and landed to pick some 30 fruit. I had a long shot at a jungle fowl. The Datoh stopped to get rotan lang to tie our rafts together at Kuala Temengor. At 7.30 we went alongside the right bank and I looked in at Sira Eseh and saw a sambur. It looked up at me and I had a shot of from 35 to 40 yards at its head. Off it went, and though we followed its tracks for about 200 yards, we could find no trace of blood. Eheu. The Datoh caught two fish from his raft while he waited. When I got back to mine, the rest of the flotilla had arrived.

I do not know whether the legend of the *burong tebong mentuwa* (the bird which cut down the house of its mother-in-law) has ever been printed in English. The hornbill, like the poor, is always with you when in the jungle. This bird is a hornbill, but the upper ridge of the bill is solid. Its cry is tock-tock-tock and then the maddest of the mad laughs. Once upon a time a girl married a man, a thriftless lout: her mother, a widow, opposed the marriage. A few days later the girl, when cooking, asked for salt. The husband said there was none. She told him to go to her mother and ask for some: the angry old lady refused to give it. He, in a rage drew his parang and hacked at one of the posts of the house tock-tock-tock and, as the house fell with a crash, he burst into loud laughter. For this crime he was turned into a bird. We often heard its cry on this trip: you do everywhere.

At 9.30 we reached Jeram Halangan, our tenth rapid. The Datoh shot through on his raft: the Assistant Penghulu said that the Datoh's raft had nearly turned over and that he was not going to dare to take me. Berkeley came up and agreed with him, that we should all get out of our rafts and lighten them as much as possible. So out we got. It was a great pity as the rapid proved quite negotiable and we went through far more exciting experiences later on. Kuala Temengor is just below this rapid and we all stopped. The Datoh's raft and mine were taken to pieces under his direction: the main deck was widened to 22 bamboos or 7 feet 6 inches. Under it 22 more bamboos were lashed: the rumah rakit was similarly widened. With Berkeley, I visited the five families (20 persons in all) who live here: they wanted rice and we left some. They gave us Indian corn and some long beans.

At Kuala Temengor we saw Meh Suli—one of the two missing cow elephants—the property of the To' Muda of Kinta.

We left at 12.45, the Datoh and I travelling in one raft and Berkeley and Simmons following in another similarly re-contructed, while the cook and a party came in the third; we immediately entered the Jeram Panjang. It is beautiful and thrilling. On each side there is a continuous wall of rocks, mostly black with a few light-topped ones; in places the passage opens out into a semi-circle, but, speaking generally, it is not 50 feet wide.

As we entered, there was a fine outstanding boulder—Berhala To' Sih Ulu—on the left, and the Assistant Penghulu, Pah Mat Nor, threw an offering on to it, uttering these words:

"Nenek minta' tabek kita na lalu: tolong hantar Tuan Besar dengan Datoh Sampei Bersiah jangan apa chachat chela."

"Oh! Ancient one, I ask for your pardon, we wish to pass. Pray, send the Tuan Besar and the Datoh as far as Bersiah and let no mishap befall them."

Passers-by are supposed to offer something of whatever they have: no form of offering is laid down. As one of the men on the raft said: "Tin ore or anything will do."

Three men sat in the extreme bow of the raft with paddles which they dipped over its nose to guide it: two men stood behind them with poles to shove us off the rocks, as we were washed too close to them.

The Jeram Panjang Ulu (the long up-river rapid) is a succession of rapids within rocky walls: you emerge from one into still water and in a few moments enter another and so on. The first stretch takes 20 minutes to get through travelling very rapidly, and in three cases—Punai, Trang and Goa—rushing through waves, eddies and whirlpools. Punai wet us, at Trang we apparently sank and were swept across the rapid on to the rocks on our left. Saiyid Ali, the fiddler, leapt into the water. The three men with paddles were swept off their seat and swam towards us. The raft swung round to the rocks on the left, notwithstanding the herculean efforts of the two men with poles. The three paddlers helped by the Datoh sprang to the bow of the raft and pushed off from the rock. Saiyid Wahab held out his hand to me and said: "You had better get off on to the rock." But I sat still, for it never occurred to me that the raft would not right itself and I was intensely interested. It all was over in a minute and we went on in the rushing water only to reach Goa. The word means a cave and there is said to be one deep-down. All we saw was a whirlpool and the rush of water sucked the raft to the left, but it was deftly turned off the rocks by the polers and we went on into smooth water after, as I have said, 20 minutes seething with excitement. In a few minutes we entered another rapid.

Many years ago Messrs. Bozzolo and Lauder, while passing through this rapid, came on Goa when it was sucking (*mengisap*), as it does at a certain stage of the water. As the bow of the raft went under, they jumped on to the rocks but lost everything.

We were borne on in deep water where the poles could not find bottom and, where the rush of water was too great for the steersmen, on to a small rock—we hit it—jumped back and then the starboard steersman pushed us off it with his paddle. A little later, at 1.25, we heard Berkeley calling and saw him on a sandbank a quarter of a mile back. We poled into the bank and sent half a dozen men to see what had happened. Several of his lower tier of bamboos had been smashed: so we stayed where we were for the night. I found I had lost a pair of English shooting-boots.

On the 11th August, we started off at 7 a.m. Very fortunately it had rained heavily in the night: the river had risen from 18 inches to 2 feet and our journey was made much easier for us. At 8, just as we were about to shoot the jeram ringat, we saw the last of the missing cow elephants (Rana Kamuja) within a few feet of the right bank; we poled into the bank below the rapid and sent in two men to catch her. At 9.15 they came back to say she had bolted.

The Ringat river is pouring mining silt into the Perak, a fouling that must be speedily prevented.

At 10 a.m., we reached the head of Jeram Brusa. We stopped for ten minutes, while experts examined the state of the water. It was decided that we could go through the smaller channel. We started, and for over a quarter of an hour it was a great fight against a nasty, twisting, zigzag rush of water, full all the way of eddies and whirlpools. There is one rock in mid-stream which is very threatening, but the increased quantity of water helped us to avoid it. A little later the raft was sucked a foot under, but soon rose and, rounding the last bend, we rode into smooth water. But no sooner were we out of Brusa than we were into Breksa, not so long, not so fierce, but with one difficult cluster of rocks round which the water was sucking and plunging into the main passage. We went quite close to them, so close that as the water drove us off the tail of the raft touched them. The raft was half across the stream, but the paddlers dexterously straightened her.

At 11.20 we got down do Pulau Temin, a large island, and at 12.10 passed Bersiah. Soon afterwards we obtained a glorious view of Gunong Kendrong, 4,000 feet, and Gunong Krunei 3,200 feet—two magnificent peaks. At 12.45 we passed Kampong Kota on the left and passed the mouth of the Rui river full of silt on our right. At 1.15, Berkuning, which used to be the residence of Mengkong Pah Haliah. At 1.40 we reached the Batu Mawa, where the monkeys made their treaty of peace. We arrived at Kuala Kendrong soon after 2 p.m., having been actually travelling for 6 hours 25 minutes from Kuala Temengor. This is said to be the fastest time in which the journey has ever been made.

On the 12th August, after breakfasting with Berkeley at Grit on venison, turtles' eggs and wild honey, I motored into Taiping, 87 miles.

Below is a list of some of the elephants we had with us. Their names are somewhat quaint—

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| Chapang | The solitary stag (according to Berkeley) |
| Bintang Timor | Star in the East |
| Kulop Chandan | The gentleman of Chandan (the residence of the Sultan of Perak) |
| Meh Mas | The golden girl |
| Rana Milik | The chosen jewel |
| Lanchang Patani | The boat of Patani |
| Sauk | A landing net |
| Segak Manis | Handsome (Perak Malay) |
| Janga | Do. (Patani do. ) |
| Manja | Little pet |
| Chenderawaseh | Bird of Paradise |
| Meh Suli | The girl of the sweet scent |

# My Visit to Klian Intan.

By E. W. Birch, c.m.g.

*The tin mines of Intan and Endak were opened originally by a Perak Malay, "Pawang Sêring," son of the Chief of the Northern District, "Toh Halang." The durian trees at Dusun Kalik were planted by him. After his death, the mines were a constant source of discord between his cousin, Toh Lamboh (who had then become Sri Adika Raja), and the Patani Chiefs, and a petty border warfare was the result. Sometimes one party got possession of the mines, and sometimes the other. The same sort of thing went on in the time of Toh Trosou, the next Sri Adika Raja. Then came the war with Kedah (1817-8) and the mines passed into Patani hands. Since then the Patani Malays have practically owned the country down to Bukit Naksa, and Berhala Bujok at the head of Jeram Panjang (long rapids). The Perak Chiefs and ryots have had to acquiesce tacitly in this arrangement, but they have always, when possible, asserted their right to the ancient boundary, though they have not always been able to enforce it. Many years have passed since the Intan and Endak mines paid a royalty to Perak, and since their produce was taken on elephants to Lubok Goloh and sent down to the Perak river. But the claims of Perak are not forgotten by the men of the Ulu, and this boundary question was one of the first points on which the assistance of the first British Resident was asked.*

*The first allusion to these mines, which I have found in any European author, occurs in Anderson's "Considerations" (p. 168), where he mentions a letter written by the Raja of Perak to the Raja of Kedah, in 1814, containing the following passage: "The Patani people have attacked our country and taken possession of our tin mines." After this occurrence,* *considerable exertions seem to have been made by the Government of Penang to facilitate intercourse with Patani, and to encourage the export of tin with the view to benefiting the trade of their settlement. Among the objects of Mr. Crawford's mission to Siam in 1822 was an effort "to open free intercourse with the tin mines of Patani, whence large supplies were offered to Colonel Bannerman (Governor of Penang), and where there is no doubt almost any quantity may be derived through the Murbow, Muda and Prye rivers." (Anderson's "Considerations," p. 97).*

The monthly produce of the mines seems to have been, prior to 1824, about 50 bharas (a bhara = 400 lbs.) from Kroh and 200 from Intan.

At the period of my visit the mines at Intan numbered about 40 persons, all being under the control of Panglima Chawang, who tells me that if the terms were easier he would have no difficulty in getting 1,000 men to work there.

*There can be little doubt that, under proper management, and a Government which would give some security for life and property, these mines might be rendered very productive and remunerative. Whether the Patani Malays will ever see the wisdom of encouraging Chinese miners by the offer of better terms, it is impossible to say: the Perak claim, which has been dormant since the war between that State and Kedah in 1818, may perhaps some day receive consideration, and its recognition would probably be the best security for the future prosperity of the Intan tin industry.*

The passages printed in italics are taken from the "Journal of the Straits Branch of the Royal Asiatic Society," June 1882: they were written by the late Sir William E. Maxwell, K.C.M.G., after he made his journey on foot to the Patani frontier in 1876.

It is of especial interest now that, by the Treaty of March, 1909, between England and Siam, a British Protectorate has been established over Kedah, Kelantan, Trengganu and that portion of Patani called Reman (or Rahman) which has been so long in dispute.

Ever since the British Protectorate was set up in Perak in 1874, the claims of Perak to this territory have been periodically urged by various Administrators in the Straits Settlements and Perak, notably Sir Frederick Weld, Sir Hugh Low and Sir Frank Swettenham.

It is a great triumph that in the Consulship of Sir John Anderson, and during the reign of the enlightened Sultan of Perak, Sir Idris Mersid el Aäzam Shah, G.C.M.G., it has been found possible to conclude the negotiations which have added to Perak a tract of country not less than one thousand square miles in extent, and a population of at least three thousand persons. The whole length of the beautiful Perak river, 260 miles from its source to its mouth, has now come into Perak territory.

From the Sultan downwards amongst Perak Malays there is great satisfaction at the restoration of a country which they have always claimed and for which they have patiently waited.

I have had occasion recently to visit the north-west corner of this territory on two occasions, travelling as far as Betong in Patani.

My first visit was to see how far it is possible to prevent the silt from the tin mines at Klian Intan and elsewhere from finding its way into and polluting the Perak river, and my second visit was to take over, by order of Sir John Anderson, the country restored to Perak under the Treaty between Great Britain and Siam.

On my first visit I was accompanied by R. O. N. Anderson and Hubert Berkeley. I started from Grit on Sunday, the 6th June, 1909. We walked 4½ miles to Pahat, and then went on to Krunei on elephants. Krunei was once thickly peopled. There are fine open plains, and here was the fort of To Nong Patani, a remarkable lady, who was a friend of, and very hospitable to, Sir Hugh Low. On my second visit I appointed Ali bin Mehar, the Kemenan, to be our Penghulu, and under him are the villages of Pong (two), Pahit, Plang, Jong, Alei and Krunei. At Krunei, just as some of our party were crossing the Rui river, one Majid, a Patani Malay, ran amuck *(mengamok)* and killed a follower of Berkeley's, named Lebei Awang, cutting at, and slightly wounding, two others. He then ran on to Jong and gave himself up at a wedding party, and was promptly secured and bound. Berkeley has since learned that he started out with the intention of killing him and me.

He had made up his mind to cut us down if he found us on foot alone, and if not to shoot us while the elephants were being unloaded in camp, when, of course, a rifle or two would be lying about. But at Krunei there was a short halt, and the voice of Haji Brahim, calling out, " What are we waiting for? " roused his maddened spirit to action.

We camped at a village called Jong, picturesquely situated, with the river on one side and rice fields behind, to bury Lebei Awang, and the next day sent the murderer back to Grit. He died that night immediately after his arrival. It was an awful night with ceaseless rain: the wedding chorus went on through the night intermittently, and, when it stopped, the murderer's shouts filled up the intervals.

The Rui flows through Jong and is quite as dirty and full of silt as the Kinta river at Ipoh.

We broke camp at 8 a.m. on the 7th June and rode on elephants till 5.30 p.m. with only a short halt for lunch: the going was bad, being through rocky broken country with some plains. On one of these we crossed the line of the hundred graves of the Perak Shahids (men killed in battle), who attacked Patani and were cut down by Mengkong Delaha in 1846.

Their graves are an interesting relic of the days when the Northern Perak Chief (the Dato' Sri Adika Raja) in an attempt to recover what he considered to belong to Perak—viz., the mines at Klian Intan—came into conflict with the Reman power.

We camped at Kuala Endak. The Endak brings down the silt from the Reman mines. It flows northwards and empties itself into the Sungei Kwa. The Kwa flows southwards and is clean as far as Kuala Endak. After that it is fouled, and in turn flows into and fouls the Rui.

Early on the morning of the 8th June we walked up the bed of the Endak for two miles to Rantau Panjang. The river is very badly fouled, and brings down stuff that ought never to be allowed to escape into any river. In places the Endak is very narrow with precipitous rocky sides, while elsewhere it widens out. It is a very easy river to dam, and three or four dry stone dams will, Anderson thinks, keep back the heavy silt, which would then fill up the wider portions of the river. But additionally heavy silt should be retained up above at each mine.

Above Rantau Panjang there are Chinese miners at Kota Bunyi.

We left Kuala Endak at 11 a.m. on the 8th June and rode on elephants to Lapang Nenering—the scene, in 1845, of a battle between the men of Perak and Patani.

There we stopped in some beautiful wide plains for lunch, and found 48 Patani men, with 100 buffaloes, bound for Ipoh. We journeyed on, crossing the watershed, and at 4 p.m. camped at Berchang. On the 9th June we broke camp at 8 a.m. and reached Betong at 11.45 a.m. This is the headquarters of the Siamese District Officer or Amphur—Wan Husein. He was hospitality itself to us. He gave us a roomy house all to ourselves, and we lunched and dined with him.

At his pressing invitation we spent the next day, the 10th June, at Betong and went out for a deer drive without success. Wan Husein's wife brought out lunch and an excellent curry, which we ate out of doors on the banks of the Kasinei river.

On the 11th June we left Betong for the mines at Klian Intan on elephants, Wan Husein accompanying us. We travelled along an earth road for 14 miles. At 11.30 we crossed the Samagaga Pass (watershed) into what is now Perak territory. We crossed and recrossed the Sungei Kwa and entered the Kroh plateau. This was the place chosen in anticipation in 1883 by Sir Hugh Low for an Upper Perak Station. It is about 1,500 feet above the sea—is cool, and there are few mosquitoes. It has been extensively occupied in the past and carries a not inconsiderable population now; there is plenty of good water.

My own opinion is that the lowest pass from the Kroh plateau to the mines, and also the lowest pass from the Kroh plateau into Kedah, will be found to be at Padang Niring Todok. We then went on to Padang Berkwai, a mile or so further, and camped there. Dato' Mat Saleh, the Kemenan of Kroh, received us and had a long chat.

On my second visit I appointed him to be our Penghulu. Under him are the villages of Becha Deradap, Padang Berkwai, Kwa (three), Kroh and Klian Intan.

Under the Kemenan are "Neban" (local headmen), who are only appointed if there are ten families in a village. They have no very definite rights or duties, but are occasionally useful to the Penghulu or Government Officer when labour has to be procured for some special purpose. They have hitherto been responsible for the carrying out of "forced labour."

At 8 a.m. on the 12th June we moved on, and at 12.40 reached the mines—very bad broken hilly country. Mr. Kemp, of the Reman (or Rahman) Tin Mining Co., met us and put us all up. Mr. Kemp's mine is a revelation, and it is almost incredible that he has been able to convey so much machinery and set up so magnificent a mill in such an inaccessible place. There are 25 head of stamps on a hill, next door to Mr. Kemp's house. Water is brought by gravitation from the Kajang river from a hill behind. Firewood is brought from the valley below on an endless chain, railway trucks, full of water, pulling up the trucks of wood. The mine itself is a hill, 2,300 feet high, in front of the mill, but ¾ mile away. An overhead wire rope—3,800 feet long—carries 11 cages at one and the same time, brings the stone from the hill top to the mill, and takes empty cages back to be filled. The mine is technically known as a Stockwerk, and it is estimated that it will produce 10,000 pikuls of tin in the next twelve months. The property is 220 acres in extent.

The Rahman Hydraulic Mine—Mr. Pearse, Manager—has about 600 acres of land all round Mr. Kemp's hill top. The water for this proposition is brought in an open ditch for eight miles, but is hardly sufficient in quantity. There is a considerable area of land to be worked, and the output for the next twelve months is estimated at 4,000 pikuls. Tin and tin ore is exported viâ Becha Deradap to Baling in Kedah, where it is taken in boats down the Ketil and Muda rivers to Kuala Muda, and thence to Penang.

The village of Klian Intan is in a basin surrounded by hills. One of these was occupied by the Siamese Police Station, where there are an Inspector of Police and 20 Siamese Police.

The village has since my first visit been burned down for the third time. It was one of the filthiest I have ever seen, and is extraordinarily unhealthy. It is filled with Chinese, the riff-raff of Perak, and a taking of finger-prints would probably prove 50 per cent. of its native inhabitants to be criminals. I was told that it contained 140 shops.

On Sunday morning, the 13th June, we walked down, accompanied by Mr. Pearse, about two miles to his dam. On our return we walked up the hill where Mr. Kemp is working, and on which one of his mine Managers lives. It was a steep climb of over 1,100 feet, but we were rewarded on arrival at the top by a glorious view.

In the long distance westward was Kedah peak: below to the north lay the far-stretching Patani valleys: to the south were visible the Perak river and the towering mass of Kendrong (4,000 feet); while in the east one could see the Legeh and Kelantan hills. A view of practically the whole breadth of the Peninsula from the Gulf of Siam to the Straits of Malacca is commanded from this hill. It was a magnificent panorama on a beautiful clear morning.

A delightfully cold bath and a capital midday meal were very acceptable after the hot walk to the dam, and after the steep climb in a burning sun.

In the evening I went with Wan Husein to inspect the Police Station in which he puts up when business takes him to the mines.

Early on the 14th June we started for Becha Deradap—six miles. Anderson and I, walking on ahead, did the distance in exactly two hours, and on my second visit Jelf and I did it in the same time. The road is quite impossible in gradient, and rain makes the clay soil very slippery. It is pleasant to descend into the beautiful open plateau of Kroh.

At Becha Deradap, corrupted by the mines' people into Cheradap, Mr. Kemp and Mr. Pearse each have a store, and the Siamese have an Inspector of Mines, a Customs House, and a Hospital which has never been used. It was erected by the munificence of certain persons as a memorial of the Siamese Administration, and it is an excellent building of squared timber with a shingle roof.

There are a few shops and a considerable peasant population planting padi. The road from Betong through the Kroh plateau ends here. Near by is the charming natural lake at Tasik, a curious phenomenon of which is that it is periodically half emptied by what appears to be a natural siphon in the shape of a deep hole some distance from the main lake, the water re-appearing about two miles away.

This lake occupies about 25 acres of ground when fairly full. It is one of the very few natural lakes in Malaya. It is most picturesque, and at one end of it is a very ancient and quaint Buddhist temple, which ought to be repaired in old style and preserved. We camped by the lake that night.

On Tuesday, the 15th June, we broke camp at 8.30 and Anderson and I walked on ahead, 5½ miles in 1¾ hours, into Baling, a Kedah Station, where Che Mat Deli, the Malay Magistrate, entertained us. Baling is one of the most beautifully-situated places I have ever seen. It is on the banks of a big river (the Ketil), and just across the river, rising perpendicularly, is an immense limestone rock as like as possible to Gunong Pondok at Padang Rengas, only more covered by vegetation. Mr. Kemp and Mr. Pearse each have a comfortable house at Baling on the river bank, and all their tin is shipped there in boats for Penang. The little town was decorated in our honour with flags and Che Mat Deli turned out a guard and the whole population. A fine new Police Station and Barracks have been built by the Kedah

Government. Che Mat Deli gave us dinner, and after dinner we witnessed a capital *Ma'yong* (theatrical performance).

Che Mat Deli provided me with a comfortable Government boat and gave me a Kedah Sergeant and constable as escort. We left at 7.45 a.m. on the 16th June down river, Wan Husein still with us. We reached Kuala Kupang at 10.15 a.m. There is a village here, and one of the Kedah Rajas is in charge (Tungku Eda), but he had gone to Kedah on account of the death of his father, the famous Tungku dia Udin. Che Mat Deli left us to return to Baling, and we went on downstream. We tied up for the night at a place called Padang Pulai. All this part of Kedah, as far as the eye can see and right down to Kuala Muda, consists of flat plains, and they would carry an immense population if irrigated.

We continued our journey at 5.35 a.m. on the 17th June. At 7.15 we reached Kuala Ketil and entered the Muda river, a magnificent sheet of water navigable up to this point by launches of 40 tons. I landed and visited the Police Station, where the Kedah Government keeps a Sergeant and six men, because the people were a thieving lot and used to rob stores while being taken out of big boats, which bring them up the Muda river, to be loaded into smaller boats, which take them up the Ketil river to Baling. From Baling goods are humped by coolies, 11½ miles to the mines, a climb of 850 feet. Owing to this expensive transport, every pikul of stuff used at the mines costs $8 more than its market price in Penang.

The Ketil river is one of the most winding I have come across, the turns and bends often come right back on each other. It is swift running and is full of snags. It takes six nights to go up from Kuala Ketil to Baling, and when the river is high it may take ten or eleven nights.

A perfectly flat road can undoubtedly be made on the proper left bank of the Muda river, to cross the Hetil river about a mile below Kuala Kupang to a point about 1½ or 2 miles above Baling. It would then climb over one pass into Padang Niring Todok and over another pass behind that place into Sungei Buloh (the site of Mr. Pearse's dam), and thence into

Klian Intan. The distance, I reckon, would be about 28 miles. There may, of course, be a better route from Baling to the mines. At 9 a.m. on the 17th June we left Kuala Ketil and went on down the Muda. The river is clean until you get to the Kuala Seding and Kuala Karangan. We got to these rivers at 11.20 a.m. They are within 50 yards of each other; the former, the bigger on the two, comes down quite clean, and the latter is very badly fouled, persumably from the Kulim mines.

At 12.15 we stopped for lunch at a settlement called Alor Madu. It is a very old Siamese Settlement, and there were several priests there. They have quite a nice Waht or temple, and were very civil to us. At 3.20 p.m. we passed the pillar, which marks the boundary between Province Wellesley and Kedah, on the left bank of the Muda. We stopped for tea and a nice bath in the river below the Province Police Station of Pinang Tunggal and soon afterwards came in sight of Penang. The afternoon was so beautiful that it beggars my powers of description. Kedah peak and the small hills were bathed in the light of a lovely sunset and it did not get really dark till past 7 p.m. We reached Kuala Muda at 8 and were housed in a capacious and well-built Rest-house, where we were the guests at dinner of Inche Mat, the District Officer.

On the early morning of the 18th I went round the town of Kuala Muda with Inche Mat and the Malay Inspector of Police. A guard of honour was turned out and I visited every public office, the hospital and Inche Mat's house. The Kedah Administration has established itself on good lines at Kuala Muda. The country beyond the town is in need of roads.

Inche Mat took us across the river at 8.30 a.m. and saw us into my motor car in Province Wellesley, whence, after thanking and saying good-bye to him, we motored to Taiping—71miles.

The whole distance travelled was about 300 miles. We had rain the first night at Jong, rain in the night, one night at Klian Intan, and a sharp Sumatra in the afternoon at Baling. The rest of the fortnight was fine, and for the most part the weather was cool.

# The taking over from Siam of Part of Reman or Rahman.

BY E. W. BIRCH, C.M.G.

In the account of my visit to the Klian Intan Mines I stated that my second visit was made by order of Sir John Anderson, G.C.M.G., the High Commissioner for the Federated Malay States, to take over under the Anglo-Siamese Treaty that portion of Reman or Rahman which is now restored to the State of Perak.

I was accompanied by Hubert Berkeley, the long-time District Officer of Upper Perak, whose intimate acquaintance with almost everything animate and inanimate in those parts made our journey very easy; by A. S. Jelf, of the Perak Secretariat, who was of much use to me and from whose writings I have freely quoted; by the Orang Kaya Mentri, one of the Four Great Chiefs of Perak, and by the Orang Kaya Kaya Sri Adika Raja, one of the Eight Chiefs and the hereditary Chieftain of the north of Perak.

We took with us ten Indian Police to station at Klian Intan and six Malay Police to station at Tasik. Inspector Simpson went with us to place them in their stations. We had 26 elephants and a large following.

We left Grit on the 14th of July, 1909, and, by travelling all day along the Kendrong river, we managed to reach Dusun Pahit at a quarter to seven in the evening.

The next day we broke camp at 7 a.m. and reached the Rui river at 10.45. Fording the river twice we arrived at the village of Kampong Pahit, a picturesque little place, with fertile bendang (padi fields) and healthy coconuts. It contains about 40 people, who work the padi fields with their own buffaloes.

Here, as at all the villages through which we passed, a Proclamation announcing the transfer from Siamese Suzerainty to British Protection of this portion of Reman was first read aloud and then handed to the head of the village.

We then moved on, reaching an hour later a small village called Kepayang, inhabited intirely by Siamese, where we halted for half an hour for lunch.

Travelling on, we ascended an almost interminable valley, that of the Sungei Kepayang, where the going was exceedingly heavy for the elephants, up to a place called Ulu Kali, and then across some very mountainous country viâ a pass known locally as Dusun Pawang, finally arriving at Klian Intan at 6 o'clock in the evening, the whole party, including the elephants, rather wearied after two days' journey of ten and eleven hours, respectively. We were most hospitably entertained here by Mr. J. D. Kemp, Manager of the Rahman Tin Co.

There seems to be some doubt as to the name of this populous mining locality. In the story of my first visit to it I have quoted at length from Sir William Maxwell, who called it and wrote of it as Klian Intan.

Berkeley, whose local knowledge must have much weight, is of opinion that the name is Klian Hitam (Black Mine), but that, owing to the admitted inability of the Petani Malay to pronounce the letter "m," the latter of the two words has become Hitan (or Itan). He is supported in this view by Wan Husein, the Ampur of Betong, who has just handed over the district.

On the other hand, the Datoh Sri Adika Raja, whose ancestors lived and fought in and about the mines and had hereditary rights therein, states that the name was Klian Intan (Diamond Mine), the belief in former days being that diamonds were to be, or would be, found there. It is said to be a common practice among Northern Malays to drop the "n" before "t," which might account for the form "Itan.' (Curiously enough, M. de Morgan, the eminent French Geographist, who, in 1884, came out to Perak at the request of Sir Hugh Low and made a very accurate map of the Perak valley, does not refer to the place). The two European Mining Companies speak of it and write of it as Klian Intan, and I am inclined to adopt the view of the Sri Adika Raja.

I had arranged, through Berkeley, with the Ampur of Betong, Wan Husein, to meet me at Klian Intan.

I did so because that is by far the most important place in the new Territory, carrying the largest population of mixed nationalities with a not inconsiderable Siamese Police Force.

At 10 a.m. on the 16th July it was rumoured that Wan Husein had arrived. Berkeley went up to the Police Station to call on him. After some conversation they came together to Mr. Kemp's house and I went down with the Dato Sri Adika Raja to meet them. It was evident from the cordial greeting that the Ampur gave me that he was anxious to play his part in a friendly manner, and Berkeley assured me that nothing could be more satisfactory than the arrangements Wan Husein had made. He detailed them to me, and I, of course, agreed to fall in with them to the letter.

At 1.45 p.m. the Siamese Police under their Inspector and the Perak Indian Police under Inspector Simpson were drawn up in front of the Police Station on the hill, on opposite sides of the small square where the flagstaff stands on which the Siamese flag was flying. I went up with a large following of Europeans at 2 p.m., the time appointed. Wan Husein came down the hill in uniform to meet us. As he and I reached the top of the hill both detachments of Police presented arms. He took the Perak salute and I that of the Siamese Police. We then stood on the station side of the square, with our backs to the building, and Wan Husein advancing to the flagstaff made a speech in Malay to the following effect:

He had received a letter from Prince Damrong, informing him that a friendly Treaty had been made between the

King of England and the King of Siam by which the Siamese surrendered to England's protection all those countries divided by a watershed, which he shortly described, thus—the valleys of all rivers flowing into the Gulf of Siam remained Siamese territory and the valleys of all rivers flowing into the sea on the other side became the territory of England. He was only concerned about the valleys of the Petani and the Perak rivers. What now became Perak territory was not very different from the old boundaries of Perak. The territory which he was there to hand over to the Resident of Perak and to his old friend Mr. Berkeley comprised a population of 2,624, of whom 1,295 were Malays and others, 975 Chinese, 346 Siamese and 8 Europeans. There were 423 buffaloes, 441 cattle and 5 elephants, and 148 guns of different sorts. He said there were certain buildings, and he ended the enumeration of these properties by giving a humorous list of the furniture in the Police Station. He pointed out the uses to which the three tables were put, and emphasised the fact that though there were only four chairs they were large enough to accommodate eight persons. Resuming the serious and dignified way in which he had spoken, he said that all the people handed over had been under his care, and he hoped that the Resident would treat Mr. Kemp, Mr. Pearse, the Europeans working under them, the Siamese, the Malays, the Chinese, the Indians and the foreign Malays as if they were his own children.

He had invited subscriptions and had received the following sums:

| | |
|---|---|
| Mr. Kemp ... ... ... | $200 |
| Mr. Pearse ... ... ... | 200 |
| Wan Husein ... ... ... | 230 |
| Raja Prempuan ... ... | 150 |
| Ah Poh ... ... ... | 50 |
| Toh Chawan ... ... ... | 20 |
| Total ... | $850 |

in order to establish at Becha Deradap a hospital for the sick.

The building was finished, the Resident of Perak had seen it, but it had not so far been put to the use for which it was intended. He begged that now that it was taken over it would be dedicated to that use as a memorial of Siamese Suzerainty in this district and of his administrations.

Wan Husein then proceeded to haul down the Siamese flag, and both detachments of Police presented arms and remained at the present until he had done so.

Speaking in Malay, I stated that I had received orders from His Excellency the Governor to announce that His Majesty the King was graciously pleased to extend protection to part of Reman over which the King of Siam had ceded his rights, and that all Judges, Magistatates and other officers of the Federated Malay States or Perak would have the same power and jurisdiction therein as if they were in Perak. I added that Mr. Berkeley was appointed District Officer in this new territory, that "Kuasas" would be given to Penghulus and others under him, and that no revenue would be collected by any one except with the orders of the Resident of Perak. I said that in this world there were many things certain and uncertain, but that there was one thing quite certain and that was that where the British flag was flying, even justice, irrespective of nationality, would be done to everyone. I thanked Wan Husein for the help he had given to Mr. Berkeley in the past, and promised him that effect would be given to his wishes about the hospital and that everyone who proved that rights had been given to him by the Government of Siam would have his rights respected by the Government of Perak.

The Perak flag was hoisted by the Tungku Mentri and the Dato Sri Adika Raja, and was saluted.

Guards were changed, and an Indian sentry marched up into the station and took possession. Wan Husein and I shook hands, and after he had taken some photographs the ceremony ended.

The population of the district thus taken over was carefully numbered by Wan Husein at the end of the Siamese year—about six months ago—with the following result:

He estimates the Malays at 1,295, of whom 771 are males and 524 females; the Siamese at 346 (204 males and 142 females); and the Chinese at 975, of whom all but 44 are men; the Europeans number 8, all men—a total of 2,624.

We may accept his statement as to the Malays. Siamese and Europeans, but there is no doubt at all that the Chinese element has largely increased since this informal census. Mr. Kemp, Manager of the Rahman Tin Co., and Mr. Pearse, of the Rahman Hydraulic Tin Mining Co., were good enough to supply me with the latest figures from their check-rolls, which gave a total of 750 and 432, respectively. I think that the total Chinese population may safely be put at 1,500, and the population of the district, by consequence, as not less than 3,300.

There was a great deal to be done at Klian Intan. The town had been burned down and 2,000 people were homeless living in temporary bamboo shanties. I had to deal with the situation at once.

The cart-road to the mines from the Muda river, if made, must enter this valley. There can, therefore, be no more suitable place to build the new town. The higher ground, above Mr. Kemp's dump, is semi-circular in shape. I arranged for the construction of 100 chains of road. The Kajang stream will run through the new town and a bridge will be built over it. I received 192 applications for shop lots along and above this circular road. So that there should be no show of favouritism the lots were drawn for. Two houses are to be built together, and then a space of 20 feet is to be left between them and the next two shops. The shops are to be 20 ft. x 66 ft. They are to be of a permanent type, squared timber, plank walls, single roof.

A good water supply can be given to the town by pipes from the intake higher up the Kajang river.

Mr. Kemp will light both the old and new towns with four or five electric lights from his mill.

We left Klian Intan on Sunday, the 18th July, and journeying viâ Becha Deradap, the Kroh plateau and

Samagaga Pass, the route taken on my first visit, we reached Betong at 1 p.m., on Monday, the 19th.

On the 20th Mr. Berkeley and the Ampur settled the new Perak boundary in accordance with instructions, the great local knowledge of these officers rendering the task one of no great difficulty. A copy of this settlement is appended to this account.

On the 21st of July we left Betong early, and travelling viâ Lapang Nenering, the Kwa river, Plang, Krai, Jong, Krunei and Pahat, a route which I have previously described, we reached Grit at midday on the 23rd July.

By this journey, which occupied altogether ten days, of which seven were spent in travelling by elephant, we made a complete circuit of the great mountain of Kendrong, 4,000 feet high, which stands up so prominently over Grit.

The distance from Grit to Klian Intan by the way we went is 22 miles. That route will be abandoned except for the first portion of nine miles which takes you to the halting bungalow at Ulu Kendrong. At that point there is a turn-off to Asu and Pong, two villages inhabited by Siamese on the Kedah border.

The proper route from Grit to Klian Intan is that which passes Krunei and Jong: a thorough examination of the country for a good rideable bridle-path is being made.

## BOUNDARY AS SETTLED AT BETONG ON 20TH JULY, 1909, BY MR. H. BERKELEY, DISTRICT OFFICER, UPPER PERAK, AND LUANG RAJ BHARAKII (WAN HUSEIN), AMPUR OF BETONG, IN ACCORDANCE WITH THE BOUNDARY PROTOCOL ATTACHED TO THE ANGLO-SIAMESE TREATY, 1909.

*COPY.*

In accordance with instructions received from the High Commissioner, Federated Malay States, No. G.H. 34, dated 9th July, 1909, and Prince Damrong, No. 1-7006, dated 25th Mehtu Nayun 128. We are agreed that the Boundary described in the Boundary Protocol, annexed to the Treaty, dated 10th March, 1909, or 10 Minakun 127; is as follows:

From Gunong Lang in a south-easterly direction along Bukit Peringgan, forming the Watershed between the Kapas and Sama Gaga rivers, to Bukit Berapit on the cart-road; thence along the same ridge, here known as Dan Petai, to the pass between Sungei Agam and Sungei Tualang; thence it continues along the same ridge, dividing the streams flowing into the Kwa and Berchang rivers, which ridge curves gradually to the north-east, and divides the rivers flowing into the Lanka Suka and Panei rivers, to Berapit Bukit Bertam, between the Chinaha and Bunga rivers; thence along the same ridge, here known as Dan Titi Basa, dividing the rivers flowing into the Perak and Halar rivers, to Berapit Bukit Langsat between the Kijar and Halar rivers; thence along the same ridge, here known as Dan Bukit Keting, to Berapit Luar Lantei between the Meroh and Klesyi rivers; thence along the same ridge, which here curves to the south and divides the rivers falling into the Perak and Telubin rivers, to Berapit Kaho between the Kaho and Timun rivers; thence along the same ridge to Berapit Panchor between the Panchor and Gua Mas rivers;

and thence along the same ridge to a spot which divides the streams flowing into the Tado and Perak rivers.

[*Here follows the Siamese version of the above.*]

We have compared the English and Siamese versions and believe them to be identical. We each retain one copy.

[*Siamese version of above.*]

(Signed) H. BERKELEY.

(Signed) LUANG RAJ BHARAKII.

BETONG, *20th July, 1909*

True Copy:
A. S. JELF.
*28-7-09.*

# Short Notes.

## "Haji Ka-Ta-Na-Ka-La."

In No. 52 of this Journal, p. 107, Mr. W. George Maxwell, referring to the biographical account of the Mongol general Shih-pi* in Book 162 of the History of the Yüan Dynasty, hazards the guess that "Haji Ka-ta-na-ka-la" (as that work has it) stands for *Haji Kadir Nakhoda.*

This is ingenious, but wrong. Groeneveldt's translation of the passage where the name occurs suffices to upset Mr. Maxwell's suggestion. It reads: "At that time Java carried on an old feud with the neighbouring country, Kalang, and the king of Java, Haji Ka-ta-na-ka-la, had already been killed by the prince of Kalang, called Haji Kalang. The son-in-law of the former, Tuhan Pijaya, had attacked Haji Katang, but could not overcome him," etc.

From this it clearly appears that "Haji Ka-ta-na-ka-la" was a ruling prince, not a ship's captain who had made the pilgrimage to Mecca. And in the year 1292 the ruling princes of Java were not yet Muhammadan, but Buddhist and Hindu, both in their religion and their styles and titles. As a matter of fact "Haji" here represents the old Javanese word *haji*, "king,"† and has nothing whatever to do with the Malay-Arabic word for "a man who has performed the pilgrimage." "Haji Ka-ta-na-ka-la" was the Cri Kĕrtanagara mentioned on p. 142 of No. 53 of this Journal as the last ruling prince of Tumapĕl. He was dethroned by his neighbour Jaya Katong of Daha (otherwise Gĕlang) and his son-in-law Raden

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* Not "Shih-pi's account of Java," as Mr. Maxwell has it.

† It is found also in literary Malay (presumably merely as a loan-word from Javanese literature): see Wilkinson's Dictionary, s. v. *aji.* I. The ruling prince of Berunai in the time of Sultan Mansur Shah of Malacca is in the Sejarah Melayu styled "Sang Aji Berunai." That would be somewhere about A. D. 1460. Possibly Berunai at that time still acknowledged the supremacy of Majapahit (see this Journal No 5, p. 1), but at any rate the title is clearly adopted from the Javanese and may perhaps be an indication that in A. D. 1460 or thereabouts the Berunai dynasty had not yet been converted to Islam.

Wijaya eventually became his virtual successor in the newly founded capital of Majapahit. The Chinese and Javanese accounts tally completely as regards all these personal names and they are further confirmed by contemporary inscriptions. So they may safely be accepted as quite certain.

O. BLAGDEN.

## A Termite's Nest with Eight Queens.

In the nests of *Termes malayanus* there is usually to be found a large clay queen cell in the centre which contains one queen with a greatly swollen abdomen, accompanied by a single male. The occurrence of two queens in one cell is not very rare and on one occasion while digging out a nest with Dr. Haviland, in the Economic-Gardens, we found a queen-cell containing six queens and as many males. The males had it appeared been fighting together and had their legs and antennæ mutilated. This number of queens was the highest record for a nest, till a few days ago (Dec. 14) a nest was dug up in the Botanic Gardens containing no less than eight queens. The queens were rather smaller than usual, perhaps young, and all were in one unusually large clay cell. This number must be I think an unique one, and hardly likely to be exceeded.

H. N. RIDLEY.

## An Insectivorous Hornbill.

During a recent trip to Mt. Penrissen in Upper Sarawak, Mr. H. B. Crocker of the Sarawak Government Service shot a fine male example of *Rhytidocerous undulatus*, Shaw. On opening its stomach I was much surprised to find two large green Cetoniid beetles evidently eaten quite recently. The Cetoniid proves to be *Chalcothea planiuscula*, Bates, which is fairly common on the higher slopes of Penrissen, although apparently found nowhere else in Sarawak.

As I believe the Hornbills are generally supposed to be fruit-eaters only, perhaps this note may be of some interest. I notice that Mr. W. T. Blanford in the Funa of British India series, Birds Vol. III, refers to instances of insects eaten by *Dichoceros bicorniis*, L. but not by other Hornbills.

J. C. MOULTON.

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## Corrigenda to No. 53 of the Journal.

| | | | | | |
|---|---|---|---|---|---|
| p. 142, | l. 8 | *for* | cri | *read* | çri |
| | l. 27 | *for* | cri | *read* | çri |
| p. 143, | l. 25 | *for* | 1331 | *read* | 1328 or 1329 |
| | l. 33 | *for* | now | *read* | vow |
| p. 144, | l. 14 | *for* | ڠاسکٔ ، | *read* | ڠاسک |
| p. 147, | l. 14 | *for* | Tĕga | *read* | Tĕba |
| | l. 15 | *insert a comma between* | | | Siyak *and* Rĕkan |
| | l. 16 | *for* | Barta | *read* | Barat |
| | l. 26 | *for* | Kalasaludung | *read* | Kalkasaludung |
| | l. 36 | *for* | re | *read* | ri |
| p. 148, | l. 1 | Hujung *really belongs to the end of the preceding line* | | | |
| | l. 34 | *for* | Gerinei | *read* | Gerini |
| p. 149, | l. 11 | *for* | Nacor | *read* | Naçor |
| p. 150, | l. 9 | *for* | Kañjapiuiran | *read* | Kañjapiniran |
| | l. 13 | *for* | (Hyang) | *read* | Hyang |
| p. 156, | l. 21 | *for* | felt | *read* | left |
| p. 160, | l. 22 | *for* | 1337 | *read* | 1377 |
| | l. 26 | *for* | Island | *read* | Islands |
| p. 161, | l. 2 | *for* | ben | *read* | been |
| p. 168, | l. 29 | *for* | lalei | *read* | talĕi |

| | | | | | |
|---|---|---|---|---|---|
| p. 169, | l. 6 | *for* | tĕlūt | *read* | tĕlut |
| | l. 20 | *for* | retracted | *read* | retraced |
| | l. 24 | *for* | produce | *read* | reproduce |
| p. 170, | l. 6 | *for* | Ploynesian | *read* | Polynesian |
| | l. 12 | *for* | tĕliling | *read* | kĕliling |

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